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LANDLIFE AND THE NATIONAL WILDFLOWER CENTRE

New directions for the conservation movement

Grant Luscombe, MIEEM and Richard Scott, MIEEM

The deluge that hit Britain last autumn is a foretaste of climate change to come. Hotter summers and wetter autumns will be the norm and government scientists have indicated that habitats will move northwards at a rate of 50-80 kilometres per decade! By 2050 the south of Devon could have the climate of the south of France.

This shocking scenario threatens the very basis of conservation strategies. It is all the more shocking to find that despite carbon isotopes identifying man as the culprit, world leaders find themselves unable to agree let alone achieve, carbon reduction targets. The future for much of our cherished landscapes looks bleak.

Trials by English Nature at Whytham Woods, mimicking climate change conditions, resulted in lowland vegetation crashing. Such potential impacts are too much for some and many people are in denial. The climate change threat is compounded by a continuing decline in species richness and diversity - the 2001 Countryside Survey highlights a further 10% decline in floristically rich grasslands in the last ten years, and 20% for calcareous grasslands. Surely we have reached a point where a species recovery programme is needed for our so-called 'common species', and not just the rare ones.

We have always manipulated the environment for our own purposes. Change in truth in terms of the British landscape is nothing new. Perhaps it's a question of do we get the landscape we deserve, or do we strive for something better? Today the arguments are more powerful than ever. For social justice reasons we should be making nature accessible for people, people who are the ecologically dispossessed. We should be considering alternative agricultural practices that lead to more sustainable biological landscapes. And we need to consider the economic reality of our proposed actions.

Over the past 26 years, Landlife has pioneered new approaches and developed the philosophy of Creative Conservation; the making of new places where wildlife can flourish and develop which people can enjoy. Based on practical research programmes, it has demonstrated that sustainable new wildflower landscapes can be created on sites of little ecological value. It argues that by getting the starting point right, natural processes and the evolutionary dance can create valuable new habitats for wildlife and people. By working on suitable base substrates and introducing core common species, a framework can be established for long lasting floristically diverse areas to develop.

Creative conservation landscapes advocated by Landlife use a simple matrix of species to create edge effects, allowing nature to mould the final result, with an appropriate level of management. The edge is the meeting place between chaos and order, where nature wants to come to, where creativity is born. This approach has been most successfully demonstrated at the 1.7 hectare topsoil stripping site in Huyton on Merseyside, using a simple combination of key common species on a low fertility substrate. The landscape was sown with a total of 16 species in 1993, and in 2000 it was recorded as having a total of 57 species, the increase having occurred in only six years- a classic example of biodiversity in action if ever there was one. In the recent seminar on plant provenance held at the National Wildflower Centre, one of the suggestions put forward proposed building on the idea of having "skeletal" wildflower mixes, made up of species with wide distribution type. This harks back to the original recommendations of creating Attractive Grasslands by Terry Wells (1979) which always stated the virtues of using species of wide distribution. In fact commercially available native wildflower seed mixtures generally fall into this category anyway, and only make up a small percentage of the British flora.

Farmers attending a Landlife Training Day

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Editorial

Well the election has been and gone and what are we to make of it? Firstly the campaign as a whole paid scant attention to environmental issues other than the occasional reference to petrol prices. Climate change, occasionally mentioned, was more in the context of what to do about President Bush.He has featured regularly in this column and it is fascinating that during his recent visit and with half of his home State of Texas under water from a recent phenomenal deluge, that his view on climate change was utterly unrepentant. What more will it take? - a real challenge for this new government if ever there was one.

But the election was significant and the first results are already visible - the much heralded Department for the Environment, Food and Rural Affairs - DEFRA. It has taken on the environment, rural development, countryside, wildlife and sustainable development responsibilites of the Department of the Environment, Transport and the Regions - DETR; animal welfare and hunting from the Home Office and of course Agriculture and the Food Industry from the former MAFF. It now sponsors the Environment Agency, the Countryside Agency and English Nature The significance of this may be far reaching and from the IEEM viewpoint, there is now one Department which covers virtually all the interests of IEEM UK members.

IEEM will surely wish Mrs Margaret Beckett every success in her new and exciting venture. She will continue to have the support of the much respected Michael Meacher as Minister of State (Environment), Alun Michael, Minister of State(Rural Affairs) with Elliot Morley and Lord Whitty as Parliamentary Under-Secretaries.

As we have a Labour government it is worth examining precisely what was said about the environment in the Labour Manifesto - 'Ambitions for Britain'. You have to look fairly carefully as the word environment is not mentioned in any of the 25 'Steps to a better Britain' But in 'Britain strong in the world' there is a section entitled the 'environmental challenge' which gives a very clear commitment to the implementation of the Kyoto protocol. In the same section there is support for the carbon tax and trading, hybid and fuel cell vehicles, a target of 35% household waste recycling by 2015, water management, environmental protection and sustainable development,and finally 'to improve marine and forest conservation overseas and in the UK'. In 'Prosperity for All' it states that Labour is determined to protect Britain's landscapes and wildlife and there is a commitment to try and achieve reform of the CAP and encourage aspects such as organic farming. There is also reference to creation of new national parks and the greater protection of nature.

During the height of the Foot and Mouth outbreak there was much talk about achieving sustainable agriculture as if real progress was round the corner. Alas this may not be the case. There may well be a hardening of farmers attitudes against access and there are now reports of former livestock farmers turning more to arable with the susequent threats to permanent pastures. It is vital the momentum for change brought about by the miseries of FMD and the endless deluges of last winter is maintained. We look to the new Department to take the initiative and IEEM must be ready to co-operate and contribute where it can.

Jim Thompson

The Institute is immensely grateful to those organisations listed below who have made financial contributions or provided substantial 'help in kind' to support its activities during 2001

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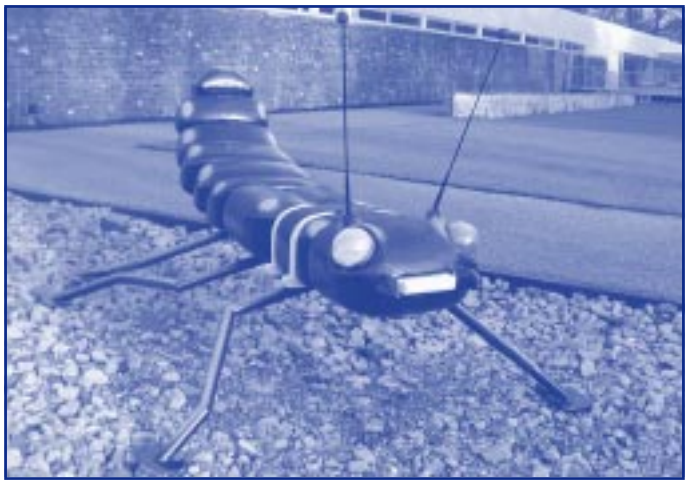
We have become increasingly convinced that basic new habitats created in this way on a large scale could be sustainable and would make a dramatic impact on declining populations of once common species. In the light of the countryside surveys and the new threats facing wildlife, Landlife felt that there was a case for establishing a national centre, drawing on experts from environmental, governmental, political, academic and business backgrounds to take the concept forward. By the year 2000 Landlife had established the £4m Millennium Commission funded National Wildflower Centre.

Set in a 35 acre park in Knowsley on the fringes of Liverpool, the Centre is not only a place where the public can learn about creating new wildflower landscapes but is also a base for seminars and training programmes. The innovative 160m long glass and concrete working wall and rooftop walkway has been shortlisted for a RIBA Award and is offset by a traditional stable block and walled garden once owned by the Gladstone family. It emphasises that wildflowers are as much about the future as the past. The site features demonstration habitats, Landlife's wildflower seed and plant production base, training facilities, exhibitions, cafe and shop.



Devil's Coachhorse on display at the Centre

There is a huge demand from people for information on creating new habitats; gardens have the potential to be a 5 million acre nature haven. The really exciting opportunity is to engage communities in making and caring for new habitats on their doorsteps. Sterile ryegrass swards that are unused and routinely mown, thus adding to greenhouse gases, are a prime target for creative conservation initiatives. Landlife has taken such sites, removed the topsoil and its weed seedbank to create a stunning wildflower meadow now populated with bee orchids, locally rare grasses, hay rattle and cowslips. Elsewhere, wastes have been used to solve a waste problem - these industrial by products can provide interesting low nutrient substrates for wildflower establishment.

The opening of the Eden Project in Cornwall has demonstrated how people can be excited by a major new botanical venture. People have flocked to see it, even during the construction phase, and when you visit you can feel a real sense of excitement in the air. We need bolder innovation; its a long time since we have seen this kind of grand vision, yet, it is only a hundred years ago as a society that we had the confidence to lay out large public parks at the heart of our towns and cities. Sadly today we tend to fight shy of our ambitions. As Tony Kendal points out in the guide to the project:
"Human beings have caused a lot of problems in the world, but there are also places where we have lived in harmony with nature without complete destruction, and sometimes with beneficial effect. Many of the challenges that lie ahead can only be met by people being there, not by walking away"

The Eden project is about showcasing these steps toward good stewardship. Creative conservation, similarly, is about stimulating positive action and delighting people by what happens in the process. Sometimes we get desperately caught up in the outcome when sometimes it is the process itself that is more important.

In establishing our own targets for very specific vegetation communities we often work against the flow of nature itself, and again placing our own perception about what should grow where. The concept of creative conservation is about flexibility and getting the conditions right in order that something better can develop in conservation terms. It is about how we can work simply, and cost effectively to make largescale and positive contributions to society as a whole. It is about being more inclusive and celebratory.

Nigel Dunnett working at Sheffield University has initiated a series of questionnaire based studies on the reaction of the public to wildflowers in formal park situations. They show that people do want more of this kind of landscapes when they are asked. We need more of these studies. Sometimes the professionals can be presumptious about what people want, without ever demonstrating the basis for their assertions.

Its also about being creative in terms of the solutions, Landlife does not pretend to have all the answers, but in a hard funding environment we have always believed necessity is the mother of invention. It is perhaps ironic at this time of crisis in the countryside that some of these fundamental issues like trying to restore an intimate contact with nature have already started in urban areas. If there is now a timely re-assessment of what we should do these 'urban' lessons should not be forgotten. Plantlife has raised concern about the lack of individuals with good botanical knowledge, but we will not raise fresh interest and inspire young people if we cannot raise the profile of these issues in peoples lives. We need to inspire people, and inspiration does not come half-heartedly; now is the time for action.

Good practice in wildflower landscaping has shown that long term seed establishment occurs best on low fertility substrates (Flowers in the Grass, English Nature (1992), Wildflowers Work, Landlife 1995)). Landlife is now interested in developing trials involving topsoil inversion to create the right conditions for wildflower establishment on land coming out of production. Specialist ploughs can bury the topsoil and bring the low nutrient subsoils to the surface in a reversible process (if need be). For areas where tree planting is being combined with wildflower sowings, the uncompetitive subsoil sward may reduce the need for herbicide applications and enable trees to root into the rich topsoil rather than simply grow through it. Such open sites are a boon for invertebrates with their knock on effect up the food chain.

Topsoil inversion would give woodland wildflowers an opportunity to develop in situations where high fertility would otherwise be a problem. The Countryside Survey 2000 (DETR 2001) reports an increasing domination of false oat grass, common nettle and cleavers in the broad habitat type, and highlights the problem of eutrophication. This is commonly the landscape type targeted for tree planting. Sowing wildflowers on exposed subsoil amongst tree plantings may thus provide a solution to enable the parallel establishment of woodland flora with new tree plantings. Wildflowers benefit both from reduced competition by aggressive and dominating species and from a reduced seed bank of weedy species. In the long term this would help to establish a landscape rich in biodiversity rather than a simplified landscape of trees with coarse grasses.

Pilot projects to demonstrate this possible approach are being jointly undertaken by Landlife, the Woodland Trust and the National Forest. The selection of potential areas will target soils both amenable and problematic to this technique. Monitoring will be an important part of the topsoil inversion pilot projects in order to test crucial aspects of the hypothesis.

A joint initiative between the Community Forests and Landlife, called Woodland Wildflowers is providing training to involve communities in sourcing local seed for later introduction into new woodlands as well as using the seed to diversify the genetic stock of Landlife's 100 acre seed production operation on Merseyside. Although here the process of getting people into woodlands to view, appreciate and then collect and multiply woodland wildflower populations is more of a driver for the project than genetics. These operations include the establishment of bluebell rows to create a sustainable source of native bulbs to meet the demand that is otherwise resulting in the illegal destruction of our bluebell woods. This autumn we will be lifting the first crop for chipping to speed the production process for this the only wildflower for which Britain has a world significant population. Research data from the Woodland Wildflower project will be used to enhance the results from the topsoil inversion pilot projects.

Children visiting the Landlife Centre

The National Wildflower Centre is poised to be an independent driving force for practical and positive change led by a Board of Trustees of national repute (including, the Countryside Council for Wales, Sheffield and Liverpool Universities, The Wildlife Trusts, Groundwork Foundation, Plantlife, Wildfowl and Wetlands Trust, an MP, two Local Authority Chief Executives and leading ecological journalists). However, along the road there are many issues to be resolved. Under the auspices of the NWC, Landlife has organised expert seminars with the London Wetlands Centre, National Urban Forestry Unit and Plantlife on topics ranging from introduction techniques through to genetics. On issues such as provenance there is not a clear consensus, although the recent seminar at the NWC found broad agreement on the use of common core species of British provenance in urban environments and locally sourced material for sites adjoining designated sites. For the range of sites elsewhere it was agreed that further research was needed to clarify a confusing and at times conflicting genetic evidence. Whether there is sufficient time for clear evidence to emerge is a moot point. In the meantime people will be creating new habitats and the wildlife that these sites so demonstrably support may be the overpowering imperative to proceed with this flexible and practical approach.

One of the saddening long term aspects of our work is the way created sites as yet have no registered value in terms of their conservation interest. As a result they can be easily dismissed as "introductions". The fact they have been consciously created is taken as a negative factor, in contrast to semi-natural landscapes that are landscapes that have happened by accident or particular landscape management practice. International visitors have been shocked that Landlife's best sites effectively hold no statutory conservation value whatsoever, when in their own countries they would be entitled to the same kind of environmental assessment as a nature reserve site. In essence it is ecology on the run, and we have lost a catalogue of sites that have demonstrated so much, both in conservation and social perspectives. These powerful lessons remain with us, and their images remain for us to show others. However, the fact that all of these sites have no planning or conservation value must change. When we are thinking about the processes of nature it is perhaps creative conservation sites that emphasize the importance of the process. It seems strange they have no formal recognition and this is something we are keen to campaign for. Not that this devalues at all from the pristine semi-natural sites, but creative conservation sites do represent a hope for better future wildlife landscapes. Landscape has always been a balance between the accidental and the deliberate, and creative conservation with its flexible approach fits quite neatly in this scenario.

To some people, creative conservation is "just gardening". It is strange for a society like ours, which at one level sets great prestige on its landscape traditions, to dismiss a whole legacy of horticultural practice when we might learn much from a good gardener. Equally when we consider Management Plans for nature reserve, what are they but log-books of gardening activity. Good conservation is like good conversation: it gains from a wide perspective of viewpoints, and we can learn from the techniques of other disciplines.

For example, the experience of growing cornfield annuals on a long term basis offers an enormous skill base for the delivery of biodiversity action for rare cornfield species and farmland birds in practical terms. Still these local landscapes do not have recognition in local bio-diversity action plans despite a real relevance to the national problem. Such areas are commonly populated by birds in decline such as grey partridge, skylark, linnet and even on one occasion a corncrake!

It is Landlife's firm belief that we should do all we can to safeguard and preserve the valuable and historic landscapes we all love in the face of climate change. But we should also be creating new habitats that future generations will come to love and cherish. We should have a twin track approach, giving a value to new habitats, valuing the starting point as much as the end, initiating processes that can adapt to change, and making new places where we can appreciate wildlife in this overcrowded island.

In the light of the changes about to impact on our environment, Charles Darwin's words have even greater significance:

"It is not the strongest of species that survive, nor the most intelligent but the ones most responsive to change"

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Plant Conservation at the Royal Botanic Gardens, Kew

Peter R. Crane, FRS & Eimear Nic Lughadha

The recent reshaping of Government Departments in the U.K. that followed the June 7th election led to the creation of a new Department of Environment, Food and Rural Affairs, comprised mainly of those units previously housed within the Ministry of Agriculture, Fisheries and Food, together with key elements previously accommodated in the Department of Environment, Transport and the Regions. The new Department sponsors several Non-Departmental Public Bodies and Agencies focused on the environment, but among these few have a remit as broad as that of the Royal Botanic Gardens, Kew "to enable better management of the Earth's environment by increasing knowledge and understanding of the plant and fungal kingdoms – the basis of life on Earth".

The history of Kew extends back for almost 250 years, but its mission is as relevant today as when one of its early patrons, Sir Joseph Banks, explored the vegetation of Australia on Cook's first voyage, or when its first official Director, William Jackson Hooker, developed Kew as one of the world's premier research botanical gardens in the mid-nineteenth century. A recent comprehensive review of Kew's Science Strategy concludes that "the Royal Botanic Gardens, Kew is fundamentally a scientific and educational institution devoted to increasing knowledge and public understanding of plant and fungal diversity – how it came to be, what its current status, how it can be conserved for future generations and how it can be used in sustainable ways for human benefit". Conservation is therefore a key element of Kew's science agenda, as are efforts to promote the sustainable utilisation of plant resources, which themselves provide further incentives for conservation.

The urgent need for accelerated efforts to conserve plant species is clearly illustrated by a few basic statistics. While it is true that just three species of grass – wheat, rice and maize – provide more than half the human direct plant-derived dietary energy, around the world more than 7,000 plant species are cultivated and collected by humans for food. Furthermore, the greatest reliance on the greatest diversity of plants for food – and for many other purposes – is in those developing areas of the world where poverty is rife. In these areas the absence of other resource alternatives, combined with increasing population pressures, mean that native plants are used heavily for many purposes (e.g. food, fuel, structural materials, medicine) to such an extent that the urgent short-term needs of day-to-day survival are helping eradicate the very plants on which the medium to long-term survival of many poor people depends.

The most comprehensive survey of the conservation status of the Plant Kingdom as a whole was undertaken on behalf of the International Union for the Conservation of Nature in 1997. This study indicated that about 33,000 species out of a global total of about 300,000 species were threatened or endangered in the wild. Similarly, to take just one example from a relatively well understood group of plants. Globally there are about 800 different kinds of living conifers (about 630 species plus about 170 infraspecific taxa). Of these, 335 are listed as of conservation concern.

More indirectly, the impact of humanity on natural vegetation is also massive. In the U.K. only a few percent of the land surface is occupied by relatively undisturbed native vegetation, and the figures are similar for the Atlantic Rainforest of Brazil, the forests of El Salvador and the island of Madagascar – which unlike the U.K. are "hot spots" of the Earth's plant and other biodiversity. The extent of the catastrophe is seen most starkly on relatively small tropical ocean islands. For example on Mauritius, the recorded flowering plant flora comprises 672 species of which 75 are thought to be extinct – including 36 species that occur nowhere else and are gone forever. Of the remaining 267 endemics, 65 are known from populations with less than 100 remaining individuals.

In presenting these statistics it is also important to bear in mind the extent of our current ignorance of plant diversity. On small or species poor islands, such as Mauritius or the U.K., the flora is relatively well-known, but in some parts of the tropics it is not unusual for one out of every hundred specimens collected to represent a new species. For example, recent fieldwork in Madagascar by John Dransfield, Kew's palm specialist, brought to light 85 new species in that family alone. While the recently completed survey of the Ducke Forest Reserve near Manaus in Amazonian Brazil resulted in 750 new species out of a total of 2,175. Based on compilations that we have been making at Kew over the last decade, on average, more than 2,000 genuinely new plant species are described every year.

The extent of current ignorance of plant diversity underlines the fundamental importance to conservation of Kew's traditional work that provides baseline surveys and inventories of plant diversity in different parts of the world. In turn this kind of research is also underpinned by Kew's extensive collections, which are maintained as national and international reference collections to be used by many thousands of scientific and other visitors every year. Quite simply, collections are the indispensable samples that are necessary for any meaningful study of plant diversity, and the ability to recognise, describe, catalogue and identify the fundamental units of plant diversity is essential for research in all areas of plant science – including conservation. Any study of plants that aims to be repeatable requires consideration of the identities of the botanical entities involved.

Because the greatest concentrations of plant diversity are located in the tropical regions of the world, and because it is in the tropics where plant diversity is especially incompletely documented, Kew concentrates much of its work in these areas.

All of Kew's work overseas is governed by the Convention on Biological Diversity, which emerged from the Rio Earth Summit and has as its objectives "the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of benefits arising out of the utilisation of genetic resources". The Convention also reaffirms that the authority to determine access to genetic resources rests with national governments, and as a result many countries are increasingly endeavouring to control access to, and use of, their national patrimony, especially in relation to genetic resources and associated technical knowledge. In working overseas, therefore, Kew seeks to abide by the letter and the spirit of the CBD. In particular, it seeks to work collaboratively in mutually-agreed long-term partnerships in a small group

of countries that are rich in biodiversity, and in which Kew's work can have a significant impact in terms of supporting the efforts of collaborators to conserve and utilise sustainably their indigenous plant diversity.

Based on the recently developed Science Strategy, Kew seeks to increase knowledge of plant diversity in fundamental ways and targets specifically those plant groups that are priorities for conservation and sustainable use. Within this broad remit Kew focuses specifically on five priority spheres of operation: i) U.K. and U.K. Overseas Territories; ii) Drylands, including the dry tropics and the Mediterranean; iii) Wet Tropics; iv) Monocots (grasses, sedges, palms, orchids etc.) and v) global syntheses of plant diversity.

A clear focus on the U.K. and its Overseas Territories is important because it is one way that Kew fulfils its statutory obligations to the U.K. Government in terms of providing expertise and advice on plants and fungi. But this focus is also important in terms of the message it sends to Kew's overseas partners. It is simply unreasonable to argue for the conservation of plant diversity overseas if Kew is not also committed to conservation closer to home.

Michael Van Slageren (right of picture) collecting Terminalia mollis, Burkina Faso

Drylands cover about a third of the Earth's surface and support about a sixth of the world's population. In these areas threats to the survival of plant diversity are pronounced and there is an urgent need for careful stewardship of plant resources so that they can be used sustainably for the future. Dry tropical rangeland is one of the two biomes currently under greatest threat at a global level. Areas of particular focus in Kew's programmes include the Caatingas of Northeast Brazil and the drylands of Africa and Madagascar.

Michael Van Slageren (right of picture), overseas coordinator, seed collecting in Egypt

A focus on the wet tropics is particularly important because many of these areas are "hot spots" of plant diversity and contain a very high proportion of the world's botanical variety. The wet tropics are largely threatened by human immigration and by increased rates of uncontrolled logging. At the same time, these habitats are often poorly explored botanically and levels of ignorance about the plants they contain are high. Areas of particular focus in Kew's programmes include the Atlantic Rainforest of Brazil, the Cameroonian rainforest, the wet forest of Madagascar and the tropics of South East Asia.

In both the drylands and the wet tropics Kew seeks to support in situ conservation activities (for example establishment of protected areas) primarily through its survey and inventory outputs and associated by-products such as field guides and conservation and monitoring tools. Also key to Kew's overseas activities are efforts to build local capacity and expertise to undertake conservation and sustainable utilisation initiatives, ranging from practical training advice to support for the implementation of global conventions.

In its focus on Monocots Kew is supporting a major international initiative to improve basic knowledge of this group of plants, which includes grasses, palms and a great variety of other economically important species. Monocots are also of particular economic importance in the drylands, and of conservation importance in the wet tropics. In addition, as a result of their economic or horticultural value, some groups of monocots (e.g., bulbs, orchids) are threatened through over-collecting.

Finally, in highlighting the importance of global syntheses Kew is seeking to respond to one of the most common pleas from conservationists, ecologists and scientists in other disciplines, for convenient syntheses and overviews of the often scattered information on plant diversity. Kew has a long tradition of this kind of work that extends back to the founding of Index Kewensis in the nineteenth century but continues these efforts today. The International Plant Names Index, for example, provides a comprehensive internet-based list of all plant names that have ever been published, while current efforts, using the techniques of molecular biology, are developing the first objective and accurate overview of the evolutionary interrelationships of the major groups of living plants.

In support of these five major spheres of operation, Kew also maintains particular expertise in some of the most diverse families of flowering plants such as legumes (18,000 species), Rubiaceae (coffee family – 13,000 species) and Lamiaceae (mint family – 6,700 species). These families are of great importance in their own right but are also important if Kew is to do its work effectively in the drylands and wet tropics, where these families, together with various groups of monocots, often predominate.

For the U.K., U.K. Overseas Territories, drylands and wet tropics a key objective is to encourage and facilitate the in situ conservation of plant diversity, from the preserving of the rare filmy fern on Kew's Wakehurst Place Estate in West Sussex to the monitoring of protected areas in the rainforest of Cameroon. But botanical gardens also have the potential to help meet conservation goals through the ex situ conservation of living plants. At Kew the living plant collections are possibly the largest in the world and comprise more than 30,000 different kinds of plants – many of which no longer exist in the wild. But, still more important, are Kew's recent efforts to dramatically expand its seed banking activities.

Seed banking is a highly cost-effective means of ex situ conservation that represents a compromise between the level of technological input, the quality of infra-specific diversity than can be preserved, the length of time over which material can be kept and the relative ease of access to diverse gene products. Storage conditions to achieve optimal longevity of most species are very similar and result in storage lives that can be measured in decades, centuries and perhaps even millennia.

Seed banking has been widely used for some time for plant conservation, but a 1996 report from the Food and Agriculture Organisation makes it clear that the main emphasis has been on crop plants, which are estimated to account for 94% of the estimated 6 million seed accessions that are held worldwide. Coverage of truly wild species, as well as of many forest, forage, ornamental, aromatic and medicinal species, and under utilised crops, is minimal. The FAO Report also estimated that only 13% of worldwide seed bank accessions are held in secure long-term facilities with approved standards of temperature and moisture content (dried to equilibrium at – 50 ℃ and 15% humidity), reliable power supplies and safe duplication and regeneration procedures.

Kew has been involved in seed banking since about 1980, and since then has developed the world's largest and most diverse seed banks run to international standards and devoted to the preservation of wild species. Currently the bank contains about 10,000 accessions from around 4,000 species, representing about 10% of all plant genera and about half of all plant families. The Kew seed bank also holds collections temporarily on behalf of other countries, and the FAO base collection of land stabilisation species.

During the 1980s it was realised that while the Kew seed bank was technically successful the scale of its operation was not consistent with the scale of the challenge represented by the accelerating global loss of plant diversity. Therefore, in the early 1990s, with the added impetus provided by the U.K.'s ratification of the Convention on Biological Diversity, Kew began to consider the feasibility of a significant increased effort in seed conservation. This process led ultimately to the concept of the Millennium Seed Bank – the largest off-site conservation project ever undertaken.

The Millennium Seed Bank project has a total budget of almost £80 million, which includes both the construction of a massive new facility at Wakehurst Place in West Sussex together with a massive seed collecting effort over 10 years. Primary funding was obtained from the Millennium commission, the Wellcome Trust and Orange p.l.c.

Millennium Seed Bank at Wakehurst Place, opened November 2000

-20 degrees centigrade cold storage in the Seed Bank at Wakehurst Place

The Millennium Seed Bank project has six aims; i) to conserve the U.K. flora; ii) to conserve the drylands flora; iii) to solve seed storage problems by carrying out research into all aspects of seed conservation; iv) to encourage global plant conservation by facilitating access to, and transfer of, seed conservation technology; v) to promote sustainable development by making seeds available, under the terms of the Convention on Biological Diversity, for species reintroduction into the wild, as well as for academic research and for screening for potential new uses of plants; and vi) to educate and involve the public, through an associated exhibit and the opportunity to see the science behind the seed bank project.

The Wellcome Trust Millennium Seed Bank Building was opened in November 2000 by HRH The Prince of Wales and efforts have now shifted to the second phase of the project – a massive collecting effort to preserve 10% of the world's plant species by 2010. In particular, these collecting efforts are focused in the drylands of the world and are thus aligned with Kew's overall science strategy and other urgent conservation efforts in this biome.

In connection with the conservation of the U.K. flora the seed bank has already met its goal within the U.K. All species of native plants in the U.K. flora that can be kept under seed bank conditions, and that set seed regularly, are now stored in the Wakehurst Place facility as a result of a major collaborative seed collecting effort with conservation organisations all over the U.K.

Seed banking of the U.K. flora is just one of the many ways that Kew meets its obligations to the U.K. Government, but it also provides a great many other conservation-related services, ranging from advice to Customs and Excise on 30,000 applications for licences under the Convention on Trade in Endangered Species to the provision of advice on policy developments related to the Convention on Biological Diversity. Kew is unique in the conservation infrastructure of the U.K. More broadly it is also a major contributor to plant conservation worldwide. Both at home and overseas Kew's active involvement in conservation, as well as related research and education, seems certain to expand even further to meet increasing public concern about environmental stewardship and the loss of plant species.

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Sowing the seeds: Flora locale, four years on.

Sue Everett, MIEEM

Flora locale, was established as a project in 1997, with the support of IEEM, Plantlife and the Nature Conservation Bureau. Now, four years later, Flora locale is an NGO in its own right and has a portfolio of achievements – but still faces many challenges.

Flora locale was established to address concerns over the increasing amount of native "flora" (plants and seed) being introduced into the countryside, for purposes of habitat creation and ecological restoration. Much of this flora still does not originate from British native sources, and it has been a goal of Flora locale to raise awareness over the origin of planting stock and so encourage better specification by plant users and source identification by plant suppliers.

To this end, a Code of Practice for Collectors, Growers and Suppliers[1] was published last year and a comprehensive web site launched. The latter gives lots of information on issues surrounding the sourcing and use of native flora, from a list of suppliers to guidance on methods for creating and enhancing the flora of grasslands.

The role of public bodies

A major challenge still lies in the hands of the public sector, arguably the biggest force in the planting market. The public sector gives grants to others and procures planting stock for major projects, such as for highway schemes and country parks. A considerable amount of this planting stock procured or funded by the public sector is not sufficiently well specified. This means that although the intention is to purchase native stock (i.e. that originate from native habitats in Britain) more often than not this is not supplied. Instead we continue to see Common Alder from Hungary planted in lowland habitats (often close to existing native populations), Swedish Whitebeam in native hedgerow schemes and even Scots Pine from Germany planted in a Scottish highway project within the native Scots Pine zone. Even the wildlife garden at the Natural History Museum fell victim to mis-supply, having planted Green Alder and Broom of cultivated stock.

Flora locale has asked DETR to address this issue, as it is one which was not adequately addressed within the UK Biodiversity Action Plan although was given a passing mention! The issue of plant sourcing is critical if we are intending to fulfill the spirit of that plan and its associated Habitat Action Plans. Flora locale draws attention to this, and other policy issues, in its Action Plan for Planting with Wildlife in Mind.[2]

A major player is the Forestry Commission, which recently issued guidance on using local stock for planting native trees and shrubs[3], and has recently consulted on proposals for source identifying native trees for forestry purposes. However, this points up another problem, in that our native flora is regulated by different bodies (or not) according to its "use". Economy is the driver, while nature conservation is not. Moreover, the FC stakes a claim over trees (and possibly shrubs) while MAFF dictates what shrubs should be planted to restore a hedgerow. English Nature and the country agencies take a passing interest in wildflower seed used for meadow creation, while in England it is MAFF that grant-aids farmers to buy wildflower seed for agri-environment projects. Although a supplement is available to farmers using seed of local provenance, this is not always given and many more farmers do not apply for it. The new EC Forestry Reproductive Materials Directive, which allows source identification as an option for a wider range of species than before, only applies to trees marketed for "forestry" purposes. Bearing in mind many trees are now for agri-environment, general wildlife and landscape purposes, this is a pretty major loophole and emphasises the problems we face in trying to get a holistic approach to regulating the trade in our native flora.

Other positive actions must also be mentioned however. These include the gallant attempts of certain government bodies, such as the Environment Agency and the Scottish Executive Development Department. The EA has experimented with probably the largest ever contract-collect-grow project for its multi-million pound Maidenhead Flood Relief Channel on the River Thames in Berkshire. The EA's senior landscape advisor was determined to obtain planting stock of native origin to the Thames region, and using several contractors organised seed collection and propagation for this project. Contract collect-grow is an approach that Flora locale would like others to follow but currently it is fraught with major difficulties. These include the annual budget cycle of public bodies, which does not encourage planning ahead and the use of long term contracts. In addition, not many suppliers are not geared up to this approach – and some still don't believe that when we say we want "native", we mean it! Still, for small public projects the contract-collect-grow approach is worth trying, particularly if local volunteer or community groups can be involved. This approach would also be better, in many cases, for agri-environment schemes, especially if local farmers could themselves organise seed collections and use their land to grow plants for their own schemes and those of their colleagues.

Brush harvesting wild meadow buttercup

Approaches to planting

Another major stumbling block is the view that we always have to plant something – when this can be costly and not necessarily the best approach, either in terms of outcome or ecologically-speaking. Natural regeneration is an option that should always be considered – although whether it will be appropriate will depend on the particular project and its context.

Restoring native grasslands is a particularly interesting area of activity, subject to considerable thinking in recent years. Two of Flora locale's most inspirational training events in recent years have demonstrated that it is entirely possible to bring back wildflowers to agriculturally improved grasslands with great rapidity, especially with the help of Yellow Rattle. Donald MacIntyre will again, this June, show land managers how one of his species-poor fields on his Avon farm was transformed into a pasture rich in local wildflowers in just three years after seed from another local herb-rich pasture was hand-broadcast into the sward. Roger Wardle, FWAG Officer from Lincolnshire, will also be demonstrating two contrasting approaches. On one site, wildflower seed was sown into an existing pasture – but on his own farm, through careful grazing management, he has managed to restore an orchid-rich grassland and bring back wetland wildflowers to an area that was arable land just over a decade ago. Andrew Jones, a Director of Flora locale and the Wildlife Trusts Grasslands Officer also advocates the idea of "innoculating" swards, using small quantities of seed in consecutive years[4]. This approach is cheaper and, in the long run, probably just as effective as throwing down tens of kilos of wildflower seed in a single year. Further research on using low seed rates has also been carried out by Charles Flower at his Shalbourne farm, who is again this year hosting training days for both IEEM and Flora locale. As there is increasing interest in harvesting seed from the wild, but only limited quantities of seed available from wild sources, it is particularly important that economical approaches like this are followed so that we can make the best and most efficent use of what is available. The consequence of not doing so is that seed and planting stock from inappropriate sources will be used instead.

Even so, it is recognised that there is a real need to boost the supply of seed from local areas. Flora locale is currently developing a proposal to set up a UK-wide local seed network that will help facilitate and support local projects such as those that already exist in the Isle of Man and Weald of Kent and Sussex.

Short termism

One of the biggest problems we currently face in our rush to restore the countryside is the fact that we want to "fix it quick". Given the fact that we are all hoping to see some long term benefits from these schemes, it does seem daft that our initial time investment in these schemes often fulfills a window of no more than one planting season. As a result we often see the wrong species being planted, and seeds or plants from inappropriate localities used. As ecologists, we should take an ecological view of our habitat creation projects (and those of others we advise). What we do or advise should be appropriate to the site and its local biodiversity context. If the procurement policies of our organisations, and their grant policies to others, don't encourage best practice, then we must do what we can to change them.

About Flora locale

Flora locale is a registered charity and company limited by guarantee. Its directors are Miles King, Jane Smart, Donald MacIntyre and Andrew Jones. Landlife and English Nature are represented on its Steering Committee. Any individual with a particular interest in native flora procurement and use, who thinks they may have time and expertise to offer to the Board should contact me, Sue Everett, at sue-everett@ntlworld.com. I would also be interested from hearing from anyone who is developing, or interested in, setting up a local project which aims to collect and/or propagate native flora. Further information from Flora locale is available on line at www.floralocale.org.

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3 Forestry Commission. 2000. Using local stock for planting native trees and shrubs. Available on the FC website www.forestry.gov.uk.

4 Jones, A. J. 2001. We sow the seeds but what do we scatter? In British Wildlife, 12 (4).

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National Parks in Scotland

Scottish Section Spring Meeting, Loch Lomond

Una Urquhart FIEEM
with input from Alister Clunas MIEEM
and David Jamieson MIEEM

The 3rd Scottish Section Spring Meeting was held on a day of glorious sunshine on the banks of Loch Lomond. The morning indoor session of talks in the Balmaha Visitor Centre set the scene for the three excursion options available in the afternoon.

Scottish Section Meetings are also open to IEEM members from south of the border. We were pleased to welcome IEEM President, David Hill, who had driven north from the Yorkshire Dales National Park to Loch Lomond that morning.

In his Introduction, David Jamieson MIEEM, Convenor of the Scottish Section, reminded us that the creation of two National Parks in Scotland is imminent. To date there have been no National Parks here, unlike England & Wales. Proposals for the Cairngorms National Park are under consultation at present whereas it is expected that the National Park for Loch Lomond and the Trossachs will be in place soon. The Visitor Centre in which our meeting was held is presently run by the Loch Lomond & the Trossachs Interim Committee.

Access and Visitor Management in Scotland's First National Park.
Our first speaker, Tim Edwards, Access & Services Manager for the Loch Lomond & Trossachs Interim Committee, demonstrated tremendous enthusiasm as he described the immense complexity of issues which must be addressed in setting up this National Park. The Scottish Executive is presently deliberating the proposed boundary. Within the National Park, all aims will have equal status. This will result in conflict requiring compromise between, for instance, " conserving and enhancing the natural environment" and "promoting social and economic development". There is a complexity of land ownership within the proposed National Park area, ranging from large organisations such as Forest Enterprise, West of Scotland Water and the Woodland Trust to private estates. The aim is to get people to work in partnership. Under the Interim Committee, several strategies are already in place. These contribute to a complex but easy to follow Visitor Management Framework which has been drafted. Tim stressed the importance of investing time in differing approaches to the various communities, often with different aims, within the Park area.

Freshwater Conservation Issues in and around Loch Lomond
Willie Duncan, the Freshwater Adviser for Scottish Natural Heritage (SNH) gave an excellent talk on the freshwater conservation issues.

The proposed National Park covers three catchments and has a mix of upland and lowland lochs. The Highland Boundary Fault runs across Loch Lomond at Balmaha. The lochs with low nutrient status are characterised by *Littorella*/*Lobelia* while those with higher nutrient status have Slender Naiad. A number of different designations are in place for the protection of freshwater sites, including National Nature Reserves, Special Areas for Conservation and Sites of Special Scientific Interest. Special Areas for Conservation have been proposed to protect a range of important fish species including salmon, river lamprey and powan (this species is also listed under the Wildlife and Countryside Act). Brown trout has natural heritage and sporting importance. Ruffe, an alien species, which was introduced to Loch Lomond in the 1980's is now widespread.

The main issues are eutrophication (such as increased phosphorous from sewage treatments), acidification, shoreline erosion, hydrocarbon emissions from boat traffic, (also disturbance and noise from jet skis) and alien species/fisheries management.

Delegates to the Spring Meeting

Forest Management in the National Park
Our third speaker was Hugh Clayden, Forest District Manager of the Cowal and Trossachs Forest District of Forest Enterprise. He explained that Forest Enterprise will be a major landowner in the National Park, owning 60% of the area.

The aim is to integrate commercial forestry and tourism, bringing together a vision of forestry which will include environmental and economic sustainability. Plantations at present are at the peak stage of change because of their readiness for felling. In future "wall to wall" conifer blocks will be replaced by a more varied structure as stated in the Outline Strategic Plan for the Forest District. This document is now out to consultation in the local community. The aims include creation and restoration of native woodland. Another aim is to restore woods to "naturalness" by removing the understorey of exotic conifers in Plantations on Ancient Woodland Sites (PAWS).

Clear felling may be seen as a good opportunity to make rapid changes in age-class distribution and species. Conversely, some areas offer opportunities for alternatives to clear-fell (continuous cover systems) with less intervention. Economically, in terms of wood production, only very high-quality native timber can compete with Sitka spruce: native timber of lesser quality cannot sell. Management practices are carried out to benefit key species of conservation interest such as capercaillie and red squirrel. Deer control is a prime consideration. Although the aim is to achieve a fence-free Forest District by 2004, at present some deer-fencing is required.

Within the proposed National Park is the steep-sloped area of the Ben Lomond National Memorial Park, declared as a memorial to the dead of the 2nd World War. Here the partnership of NTS (The National Trust for Scotland), the Scottish Executive and Forest Enterprise intend nature conservation as the primary aim and propose whole-scale conversion of the existing conifer plantations to native woodland.

Panel Discussion

Questions ranged from the definition of sustainability (must include affordability) through the place of biodiversity in planners' decision-making (how high is it in the hierarchy?) to provision of Ranger Services (if any), the involvement of local communities (and the inclusion of rivers) just outside the proposed boundaries and the problem of policing of irresponsible behaviour both on land and in the water.

Afternoon Excursions

On the **Access and Visitor Management excursion** Tim Edwards illustrated his morning presentation with visits to some of the key sites in the embryonic Park's Visitor Management Framework.

A unique and innovative visitor centre/comfort facility is under construction at Rowardennan, the point at which most hill-walkers set off to climb Scotland's most popular mountain - Ben Lomond. The design is an attempt to meet modern needs using traditional crafts - and it works! The walls are mud, the roof is slate, the heating system is wood and the toilets are dry. Its organic lines and features fit in well with the landscape and it is bound to win a plethora of design and conservation awards. In short, the Rowardennan centre is light-years from the usual kit centres in Country and National Parks elsewhere.

Tim next took us for a tour of Loch Lomond's eastern shoreline which effectively acts as Glasgow's beach during the summer months. This causes enormous visitor pressure on both habitat and local infrastructure. Only with the setting up of the national park has any real strategic thought gone into managing this pressure - thought which is now the centrepiece of a draft visitor management strategy.

Finally, ice cream in-hand, we walked one of the many short-circuit footpaths being established by the Interim Committee. The intention is to get visitors beyond the car park and the beach into some of the Park's more robust habitats. Along with spectacular views and the opportunity to get some exercise, each circular path contains interpretative materials on local biodiversity, geography and the social and geological history behind much of what can be seen at Loch Lomond.

On the **Freshwater Conservation** site visit to the River Endrick and Loch Lomond, Willie Duncan led participants in discussion of the difficulties of monitoring Special Areas of Conservation to ensure that they remain in favourable conservation status.

Forest management site visit on the banks of Loch Lomond

On the **Forest Management excursion** we visited 3 different areas, led by Hugh Clayden and members of his Forest management team. In Blair Wood, once oak-dominated and later a 1950's conifer plantation, the area is now being restored to native birch-oak woodland through the removal of the conifers. At a re-stock site on East Loch Lomond we saw where mounding had been used to benefit early establishment of seedlings. Scots Pine and locally-grown oak have been planted and regeneration of Sitka spruce is removed. In Ross Wood, predominantly an Ancient Woodland site, the conifers are being felled and left for re-cycling (formerly described as "felling to waste"). Broadleaf species and Scots Pine are left standing, although some have blown down. The wood is not fenced and is a habitat suitable for capercaillie. Management includes vigilant and continued deer control.

Una Urquhart FIEEM is Principal, Marchfield Ecology; Alisatir Clunas is Property Manager, The National Trust for Scotland and David Jamieson is Country Manager, BTCV, Scotland.

THE GIBRALTAR BOTANIC GARDENS -

Conserving the biodiversity of a small territory

John Cortes, MIEEM

"The Dell" one of the more formal sites within the Alameda Gardens

Introduction

The territory of Gibraltar covers 6 square kilometres of the south-eastern tip of the Iberian Peninsula. Recognised by BirdLife International as an Important Bird Area (IBA), in particular for its importance for migratory birds, it is less well known for its plant life.

However, despite its small size, Gibraltar holds some 530 species of vascular plants in its varied habitats, representing a total of 88 families and 327 genera. (Linares et al. 1996). The habitats include open maritime vegetation on stabilised sand dunes on the east side, plants of the rocky littoral on the south, and various types of matorral that covering much of the limestone upper slopes on the western side, within the Upper Rock Nature Reserve. There are a few elements of woodland remaining represented mainly within old gardens with tree species including the Sweet Bay *Laurus nobilis* and the Nettle Tree *Celtis australis*.

Gibraltar's obligations under the Biodiversity Convention are basically by way of the United Kingdom's ratification. However, in this and in other matters of international law, notably the European Habitats Directive and the Convention in International Trade in Endangered Species (CITES), Gibraltar's House of Assembly makes its own laws and responds to what the elected Government sees as the needs of the Territory. Within this complex scenario of a small town with an important flora (and fauna) and international responsibilities in the field of nature conservation, stand the Gibraltar Botanic Gardens.

History

The gardens, known traditionally as the Alameda Gardens, from the Spanish term that describes a park area with trees (strictly these would be Alamos, or poplars) were established in 1816 on the orders of the Lieutenant-Governor of Gibraltar, General George Don, who wished to provide, to quote the *Gibraltar Chronicle*, an area *"where the inhabitants might enjoy the air protected from the extreme heat of the sun"*.
The gardens were well looked after for over a century but in the 1970s fell into a state of extreme neglect. In 1991 a contract was given to Wildlife (Gibraltar) Ltd., environmental consultants, to restore the gardens as a public park but additionally convert and manage them as botanic gardens. This work is progressing slowly but steadily within the operational budget which is provided by the Government of Gibraltar.

The city of Gibraltar with the Upper Rock Nature Reserve above

Management

The main work of the Gibraltar Botanic Gardens continues to be the restoration of this historic site. Being Gibraltar's only public park there is great, justified pressure to ensure that among its management priorities are such activities as the resurfacing of its pathways and the repair of its walls. Ten years into the project, so bad was the condition of the Alameda, this work is still not completed. Although there are planting projects in progress, the more areas that are restored horticulturally, the more resources that need to be given to maintenance, further limiting those that can be directed towards research and conservation. The other major budgetary demand is the price of water. Gibraltar is totally self-sufficient in water, and, unlike many towns in neighbouring Andalucia, which are often drought-stricken, there is never a shortage. However, most of Gibraltar's water is produced through desalination by reverse osmosis, an expensive procedure. This means that, although only about a third of the Alameda is watered regularly, the annual water bill is still in the region of £30,000.

One way in which the Gibraltar Botanic Gardens have been able to develop research and conservation activities is by establishing a close working relationship with Gibraltar's main conservation non-governmental organisation (NGO), the Gibraltar Ornithological & Natural History Society (GONHS). This Society, which celebrates 25 years of existence in 2001 is prominently active in all fields of natural history in Gibraltar and its hinterland, not least in botany, working through its botanical section. By providing GONHS with a base for botanical activities and combining resources, a great deal has been achieved.

Conservation

The Gibraltar Botanic Gardens' most important conservation achievement to date must surely be the recovery of the Gibraltar Campion, *Silene tomentosa* Otth. in DC, a true Gibraltar endemic (Linares, 1998) that was thought to be extinct. Several other taxa have special connections with Gibraltar: *Iberis gibraltiarica* and *Thymus wildenowii* grow nowhere else in Europe (but are found in Morocco), and *Cerastium gibraltaricum*, *Saxifraga glubulifera* and *Ononis natrix* probably have endemic varieties on the Rock. But *Silene tomentosa*, despite claims to the contrary (Galan de Mera, 1993), has never been found elsewhere.
After years of searching, three plants of this species were found just in time in the Upper Rock Nature Reserve in 1994. These plants died at the end of a five year drought period in 1995, but propagation at the Gibraltar Botanic Gardens has led to a healthy population in cultivation, thousands of banked seeds, and a re-introduction programme.
In conjunction with the University of San Pablo in Madrid, associated work on a similar plant 70 kilometres away on another limestone outcrop in the Andalusian hills led to the discovery of a hitherto undescribed species *Silene gazulensis* Galan de Mera, Cortes & Sanchez Garcia (Galan de Mera et al. 1999). Work with the same Spanish University and with biologists from the Junta de Andalucia has also identified a number of previously undescribed vegetation associations, this time in Gibraltar.(Galan de Mera et al. 2000).

The living collection within the Alameda includes other native species, both from Gibraltar and from its botanically rich hinterland. This hinterland includes the high limestone mountains of Ronda and Grazalema, the peridotite mass of Sierra Bermeja, and the cork oak-covered sandstones along the northern shore of the Straits of Gibraltar. These areas, the backdrop of many holiday destinations for tourists from Britain, hold a wealth of interesting species including many endemics. While these plants' requirements mean that many of them will not grow well in Gibraltar's botanic gardens, a fair number of them are represented in the garden's seed bank.

Among the plants in cultivation are common species of the scrub of the region, but also threatened rarer items like *Narcissus viridiflorus, Narcissus fernandesii, Taraxacum gaditanum* and of course *Silene tomentosa, Thymus wildenowii* and the other Gibraltar "specials". Some of these are displayed in the "Mediterranean Bed", while many of those still within the propagation facilities are destined for the new "Gibraltar Rockery" which will recreate within the gardens a representation of the craggy crest of the top of the Rock.

The Mediterranean climate of Gibraltar allows the cultivation of species from other similar climatic zones. Collections of Australian and in particular southern African plants are therefore being built up. Over one hundred species of *Aloe* are currently in the Alameda's collection, as are numerous other succulents from more arid zones.

Thirty young rare Torrey *Pines Pinus* torreyana were transferred from the Royal Botanic Gardens, Edinburgh to Gibraltar as part of the Conifer Conservation Programme and are doing well. And there is still flexibility enough in the Alameda's plans to allow more plants from other parts of the world to be banked there.

But the Gibraltar Botanic gardens are involved in biodiversity conservation beyond their gates. This may be by way of supporting NGO initiatives, like the GONHS-led programme to remove *Carpobrotus edulis* from areas of formerly important habitat.

Reseeded sand sloped covered in geo-textile matting with developing vegetation 15 months after initial seeding

The largest biodiversity project in which the Gardens are involved is, however, the restoration of the Great Sand Slopes (Cortes et al. 1999) this geological feature, a deposit of windblown sand accumulated against the side of the Rock during glaciations when sea levels were lower, cover about 45 ha along the base of the eastern cliffs of the Rock. All but 14 hectares were covered with corrugated iron sheets around 1900 to form water catchments. Now surplus to requirements, these are being removed. Both the Gibraltar Government and the UK Ministry of Defence (MOD) were persuaded by representations not to plant exotic sand stabilisers (like *C. edulis*), and instead contracted the Botanic Gardens to collect native seed for sowing on the slopes under a geo-textile matting. The plants growing from these seeds are intended to replace the latter once it has decomposed. Seed has been collected from both the small remaining area of this type of natural vegetation in Gibraltar and from nearby sandy areas in Spain. This seed is being sown as the sheeting is removed. The natural habitat of the area is a *Malcolmietalia* (dune

malcolmia annual-herb community) dune grassland (NATURA 2000code 2230; CORINE 91:16.228), and the intention is that the area should as far as possible revert to this. Sowing began in February 1997. A total of 59 species were recorded growing in 1998 and 83 in 1999. By 2000 95 species had been recorded, including *Otanthus maritimus*, which had not been recorded in Gibraltar since 1914 and could therefore be considered a re-introduction.Seed had been collected from this species nearby in Spain

Advocacy

Together, GONHS and the Botanic Gardens are the voice of nature conservation in Gibraltar. The Gardens are regularly consulted on matters including landscaping of the green areas of a housing estate or the felling of trees, and both organisations together are involved in advising the Gibraltar Government and the MOD on matters to do with land use and urban growth. Advice is being provided on the designation of protected areas in the Natura 2000 network and in the devising and carrying out of management plans for protected areas. Vegetation management is urgently required in order to maintain a diversity of habitats, as succession is causing the loss of the more open ground while exotics are spreading in some areas. The expertise available in the Gardens is essential in attempting to resolve these problems.

Undoubtedly, in a place of the size of Gibraltar, a botanic garden plays a prominent part in most things environmental. As well as in biodiversity conservation there are important roles in education and increasing public awareness. These are fulfilled through talks, school visits, publications, regular use of the local media and participation in and hosting of conferences, especially with a regional flavour. Despite the continuing political difficulties at the frontier with Spain, the Botanic Garden works closely with Spanish colleagues and its role in conserving the flora of the region as a whole is widely recognised. Indeed the Gardens' Director was recently elected onto the Board of the Parque Natural de los Alcornocales, one of the largest protected areas in Andalucia and an area that has recently been declared as having the best-conserved forest in Spain.

Conclusion

Gibraltar's biodiversity has been dealt heavy blows over the last few centuries. During the sieges of the 1700s all the native trees and shrubs were cut down and burnt as fuel for the besieged fortress. Subsequently goats limited regeneration and, most recently seral changes and exotic species are threatening plant species diversity in particular. As the human population grows and land reclaimed from the sea is progressively built over, pressure is once again mounting on the few areas of natural or semi-natural vegetation left. The Botanic Gardens must play a role in identifying the dangers, encouraging alternatives, and providing guidelines to Governments and developers while at the same time continuing with the practical conservation work they are already involved in.

At the same time, and despite a small budget, it must resurface roadways and repair walls, run an open air theatre, and look after the children's playground. All these users of the Gardens may not be aware all the time of the need to conserve the diversity of plants in their surroundings, but if these were lost, the little Territory in which they live, and the Continent and Planet within which this is situated, would be all the poorer.

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Landfill Tax Benefits Biodiversity

Andy Tasker, MIEEM

When John Gummer, then Environment Secretary, first announced details of the Landfill Tax Credit Scheme in November 1995, little could he – or anyone else – have realised that within 5 years the scheme would deliver about £100M to projects benefiting biodiversity. To put that into context, English Nature's entire budget for 2000/01 is just £62M. Now the whole scheme is under threat – and the parts supporting biodiversity are in the firing line.

The Scheme

Landfill Tax was designed as the UK's first environmental tax, with the aim of reducing the amount of waste being landfilled[1]. The tax was originally levied at the rate of £2 per tonne for all inactive waste, and £7 for all other wastes, with the Landfill Operators collecting the tax and passing it on to the Treasury. The £7 rate for 'active' waste rose to £10 in April 1999 and is now rising at £1 per year until 2004[2], in order to provide greater incentives to reduce landfilling.

The Landfill Tax Credit Scheme (LTCS – the first of a myriad of acronyms in the area) was launched in October 1996 as a key part of Landfill Tax itself. Up to 20% of the collected Landfill Tax can be diverted to environmental projects, rather than going direct to Customs and Excise. There are two main areas for these projects: local environmental improvements in the vicinity of landfill sites (to help compensate for the 'disamenity' effect of landfill) and projects concerned with promoting sustainable waste management practices, including research, education and the reduction of pollution. These aims are structured into seven 'Objects', lettered A to F (see Table 1).

Table 1: Landfill Tax Credit Scheme Categories

Object	Area of Activity
A	Reclamation of land, whose use is prevented by a previous activity
B	Reduction or prevention of pollution of land, whose use is prevented by a previous activity
C	Research and development, education or collection and dissemination of information about more sustainable waste management practices
CC	Research and development, education or collection and dissemination of information to encourage the development of products from waste or markets for recycled waste
D	The provision, maintenance or improvement of a public park or other public amenity in the vicinity of a landfill site (the park or amenity must not be operated with a view to profit)
E	The maintenance, repair or restoration of a building or other structure of religious or architectural interest in the vicinity of a landfill site (such places must be open to the public and must not be operated with a view to profit)
F	The provision of financial, administration and other similar services to enrolled environmental bodies

Funding for the scheme is not simply available to existing groups or charities, but to a new type of organisation – Environmental Bodies (EBs) – which are approved and registered by the new regulatory body: ENTRUST (the Environmental Trust Scheme Regulatory Body). ENTRUST not only registers EBs, but also any projects that EBs want to carry out. Uniquely, ENTRUST is itself set up as a private-sector regulator, not part of Government and with no funding from Government. ENTRUST's income has to be derived from a levy on projects, originally set at 1% and now 2%.

Once an EB has registered with ENTRUST and got its project approved, it must then take its "licensed begging bowl"[3] and apply to any Landfill Operator (LO) that it thinks might want to support the project. It is entirely up to the LO whether or not to provide any support, and there is no appeal process. Equally, there is nothing to stop the EB applying to as many LOs as it wants.
If an LO likes the project, and wants to support it, it makes a payment to the EB, usually of the whole amount in advance. Strict regulations ensure that the EB only spends the money – and any interest it accrues – on the approved project.

Developments

In the first couple of years of the scheme there were several teething problems to be resolved. ENTRUST found it had little money, and the regulations required much interpretation. Many new EBs were set up specifically to exploit the regulations and the millions of pounds now flowing through them. Although the regulations specifically forbade local authorities and registered landfill site operators from controlling an EB, there were many ways round this apparent ban and EBs sharing the name of a county or landfill company appeared rapidly. The aim of many of these EBs was to distribute funds to other EBs, giving them the extra challenge of applying for funding not just to LOs but also to these distributive EBs.

A further complication of the scheme is that the tax credits can only be liberated if 10% of the project cost is contributed by the Landfill Operator. Clearly many LOs could not afford the huge amounts required, and so it was agreed early on that "third parties" could pay this 10% figure. The result of this is that EBs now have to find not only a supportive LO or distributive EB, but also a third party prepared to pay 10% of the project costs directly to the LO.

Despite the fact that money is being collected under the Landfill Tax Regulations, it has been determined that the income to the LTCS is not tax or Government money at all – it is in fact a private donation by the LO. This anomaly seems to have surprised Government as much as everyone else[1] but means that registered charities may also be able to claim Gift Aid to boost the donation.

Biodiversity

The reason that biodiversity has benefited so much from the LTCS is that not all of the six categories for funding are equally easy to deliver. Categories A and B, despite their laudable aims, are quite difficult to implement. Most land requiring reclamation has an owner or operator with a duty to restore it – even if it remains unrestored for years. Reducing pollution also raises the questions of who is doing the polluting, and what is the Environment Agency doing about it.

Given that the Landfill Operators can choose where to put their money, it is not surprising that favoured beneficiaries are the communities and the

environment near their sites: Object D of the regulations. This area was, after all, one of the aims of the LTCS in the first place. Object C, including research and development, education and sustainable waste management has been broadened with a seventh category, bizarrely called Object CC, to support the development of products from waste and markets for recycled waste.

In practice, over the four years that the scheme has been operational, about half of all expenditure has been on Object D projects, about one third on Object C, with E gaining just 7% and the remainder even less[4,5]5.

Not all of Object D funding supports biodiversity projects, but ENTRUST's breakdowns are fairly consistent over the last two years (see Figure 1) and enable an estimate to be made. Biodiversity clearly benefits from the nature reserves category (17% and 15% in the last two years) but will also benefit from projects within the headings of woodlands, and lakes, rivers & ponds. Even the headings of parks & amenities, and greens, gardens & grassland, will include some gains for biodiversity. Adding just half of these latter categories to the figures for nature reserves, woods and wetlands gives a total of about 40%. And if we add slightly more it raises to 50% - but 50% of what?

Aerial view of the wetland restoration project, Leam Valley Local Nature Reserve, funded through the Landfill Tax Credit Scheme by Biffaward, the Heritage Lottery Fund and local donors

Money

Due to the way that the LTCS was set up, money has to be donated by LOs before it can be spent. Given that any project takes some time to activate, and many last for over one year, it is not surprising that the total amount donated far exceeds the amount spent at any one time. By the end of 1999 £233M had been contributed, with £104M spent. By the end of 2000 these figures had increased to £346M donated and £156M spent[5]. The latest available information, at the end of May 2001 shows that the 802 registered LOs had donated £373M, of which £211M had been spent by some of the 2,452 EBs.[6]

So from the total of £373M donated, Object D will have secured contributions of about £185M. Taking the approximation of 40% for projects benefiting biodiversity, this equates to about £75M. Increasing the percentage to 50% takes the total to £92M.

But even this is not the end of the biodiversity gains. Some of the projects in Objects A and B also have biodiversity benefits, as land reclamation and pollution control may provide new habitats in native woodlands, wetlands and reedbeds. This could add another 3% of the total – or £11M – towards a biodiversity gain, and take the total allocation to over £100M.

Threat

Despite these very positive achievements for local communities and for biodiversity, the LTCS has its detractors. Many local authorities were furious to be publicly debarred from benefiting from the scheme when they have to pay the tax themselves and have to pay to clear up the additional fly-tipping generated by the tax. Journalists found some inevitable wrong-doing, and headlines screamed of the failure of the scheme[7]. ENTRUST themselves hardly furthered their cause by waiting until February 2001 to launch a logo and brand for the scheme[5], and then disastrously found themselves summoned to a contempt hearing of the Environment Sub-Committee in April[8].

Now the knives are out. The Local Government Association has stated that: "Whilst so far the LTCS has provided many worthwhile and useful environmental schemes, *few appear to be as essential as the delivery of an adequate recycling infrastructure*…"[9] (my italics). Yet the scheme was never intended to provide a recycling infrastructure. Even Michael Meacher, Secretary of State for the Environment, has been quoted as saying: "One of the concerns about the LTCS, one of the in-built flaws, is that the last thing the landfill operator really wants to do is have his money used to promote recycling which he is in competition with…"[10]. The Government's current position was outlined in a reply by Stephen Timms, then Financial Secretary to the Treasury, on 9 May 2001, when he announced that 65% of landfill tax credits are to be allocated to sustainable waste management projects under new indicative targets[11]. The implication of object C/CC rising from 33% to 65% is that something else – local communities and biodiversity – will suffer.

However all is not quite lost, yet. As MPs come to realise just how many of their local communities have benefited from the LTCS, and how much biodiversity has gained along the way, there is hope that the axe may not fall. After all, 80% of Landfill Tax still goes direct to Customs and Excise. If the Government seriously wants to underpin the UK Sustainable Waste Management Agenda using the Landfill Tax Credit Scheme, why not divert some of this 80% towards a structured and planned waste minimisation and recycling plan? We could then see local communities – and biodiversity – still benefiting alongside recycling. A win-win situation, as the Government likes to say.

Civic leaders, Trust staff and volunteers planting the wet woodland at Leam Valley Local Nature Reserve

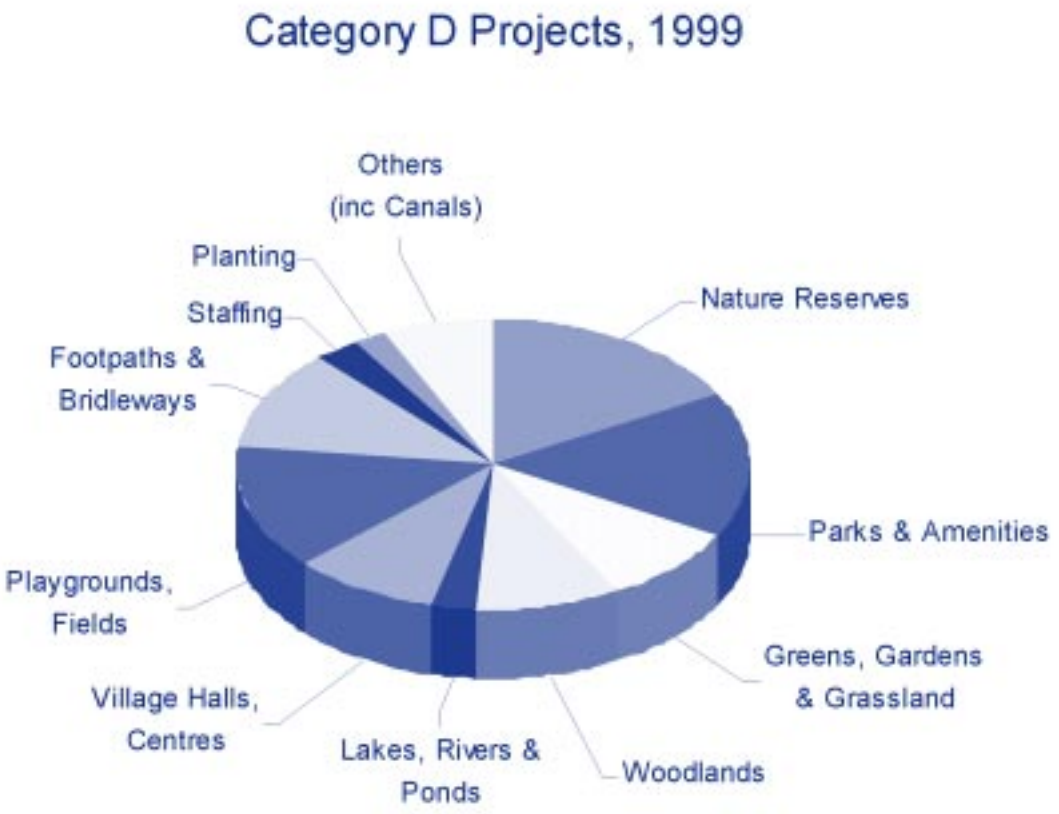

Figure 1: Breakdown of Object D funding 4, 5 over the last two years.

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2. Notice LFT1, Customs & Excise, February 2000.
3. Doug Davies, personal communication.
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5. Achievements 2000, ENTRUST Annual Report, ENTRUST, Sale, M33 7WZ
6. ENTRUST website, www.entrust.org.uk June 2001
7. See for example the Guardian website www.guardian.co.uk/landfill
8. Select Committee on Environment, Transport and Regional Affairs, Tenth Report (HC 380) April 2001
9. Select Committee on Environment, Transport and Regional Affairs, Fifth Report (HC36-I) paragraph 139, March 2001.
10. Ibid, paragraph 140.
11. Hansard, 10 May 2001.

Useful websites:

ENTRUST www.entrust.org.uk
Customs & Excise http://www.hmce.gov.uk/bus/excise/index.htm
Environment Select Committee http://www.publications.parliament.uk/pa/cm200001/cmselect/cmenvtra/36/3602.htm
EBCO (the Environmental Bodies Council) www.ebco.org.uk

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The views expressed in this article are his own.

In the Journals

Compiled by Pat Rae, Peter Shepherd and Jim Thompson

British Ecological Society

D. L. Garshelis and C. B. Johnson.
Sea otter population dynamics and the Exxon Valdez oil spill: disentangling the confounding effects.
Journal of Applied Ecology, 2001, **38**: 19-35.

This study highlights the difficulties in population studies of establishing clear links between cause and effect.
The study follows the fortunes of the sea otter populations in Price William Sound in Alaska following the Exxon Valdez oil spill in 1989 where large numbers of sea otters were killed. Boat based counts of otters during '90-'96 were as high or higher than boat based counts in the same area in the 1980s.

The authors suggest that otter numbers in the western sound may have been increasing during the late 1980s, masking the loss due to the spill. Direct evidence for such an increase is lacking because no counts were conducted during this period. However, for several years after the spill, pup production was higher than normal, which, if characteristic of the period immediately pre-spill, could have spurred a population increase. Heightened pup production may have been caused by increased food supplies: i.e. after the spill, otters obtained more and larger clams per dive and spent less time feeding per day than in the early 1980s.

The authors also bring into the picture of the sea otter population dynamics, the possible, if not probable, lingering effects of two other catastrophic events – the 19th century fur trade and the 1964 earthquake which, in the western sound resulted in an average uplift of 1.4m. This in turn resulted in an average 30% -40% clam mortality, and up to 80% in areas that rose more. Butter clams are a major food source for sea otters.

So the news is good for sea otters following Exxon Valdez, but how easily could the results have been worse? It seems to be down to the luck of timing and other factors. This is something the authors did not stress – a pity because out of context such results may in time belittle the ramifications of the Exxon Valdez mess.

M. J. Daniels, M. A. Beaumont, P. J. Johnson, D. Balharry, D. W. Macdonald and E.Barratt.
Ecology and genetics of wild-living cats in the north-east of Scotland and the implications for the conservation of the wildcat
Journal of Applied Ecology, 2001, **38**: 146-161

The wildcat is considered to be threatened by interbreeding with the domestic cat. As a result of interbreeding the definition of a wildcat in Scotland is contentious. Many authors consider pelage characteristics to be diagnostic, yet few data exist on sympatric cats with different pelages. The authors set out to answer 4 questions: 1. How do the morphologies of tabby and non-tabby cats relate to previously published criteria on the definition of a wildcat? 2. How are tabby and non-tabby cats related to each other and to other wild-living cats in Scotland? 3. Do tabby and non-tabby cats exhibit significant differences in their home range size, activity patterns and habitat use? 4. What are the implications for interbreeding between wild and domestic forms in general and specifically for the conservation of the wildcat in Scotland?

The study of 31 wild-living cats was conducted from 1995 to 1997 in an area associated with wildcats. Seventy-four per cent of cats caught had striped tabby pelages while 26% had other (non-tabby) phenotypes. On the basis of data from eight nuclear DNA microsatellite loci there was no strong evidence of two groups, and tabby and non-tabby cats did not depart significantly from Hardy–Weinberg equilibrium.

There were significant differences in gene frequencies and genotypes between the two pelage types. Non-tabby cats were also significantly more similar to domestic cats than tabby cats, although still noticeably differentiated from them. There were potential parent–offspring and sibling–sibling relationships between and within tabby and non-tabby cats, suggesting recent interbreeding. On average, however, non-tabby cats were genetically less related to each other than tabby cats.

Radio-tracking revealed that non-tabby adult females had significantly larger home ranges than tabby adult females. However, for all other aspects of home range size, social organization, activity patterns and habitat use there were no significant differences between cats of different pelage type.

The implications of these results are that traditional approaches for attempting to distinguish wild animals in the face of interbreeding with their domestic forms are neither accurate nor effective. Instead, the authors conclude that conservation should focus on mechanisms for dealing with groups of animals below the species level. Specifically for the wildcat in Scotland, conservation should focus on protection by area. If domestic cat controls were conducted within specified areas then the potential threat posed by interbreeding would be reduced.

C. Tourenq; S. Aulagnier; L. Durieux; S. Lek; F. Mesléard; A. Johnson and J-L. Martin.
Identifying rice fields at risk from damage by the greater flamingo.
Journal of Applied Ecology, 200, **38**: 170-179

Compared with all the doubt and speculation thrown up by so many ecological studies which try to define implications for site management, this study in the Camargue comes up with some practical solutions that can be applied. The proof of effectiveness is still awaited, but the results "feel right" – possible because of the involvement of the farmers in the study.

Since the early 1980s, greater flamingos *Phoenicopterus ruber roseus* have been reported to cause damage to the rice fields of the Camargue, southeastern France. The authors tested whether some rice fields had landscape features that were more attractive to flamingos than others, using data from the period 1993–97 and from 1978 different paddies. Discriminant function analysis (DFA), logistic regression (LR) and artificial neural networks (ANN) were used to identify the environmental variables best explaining flamingo incursions. The most accurate models (LR) gave 75% prediction success and used as predictors the surface area of rice fields, the presence of contiguous damaged fields, the presence of wooded margins and the distance to natural marshes.

The authors state that their study suggests that it is possible to identify accurately fields at risk from damage in order to concentrate scaring methods. They also suggest that planting hedges should be promoted, and wood cutting discouraged, in high-risk areas.

Following the study, a programme of planting of hedges by the Natural Regional Park of the Camargue started at the beginning of 2000. The authors are clear that presence–absence modelling can have clear applications in managing important species that sometimes cause negative impacts locally.

Flamingos in the Natural Regional Park of the Camargue

L. H. Liow; N. S. Sodhi and T. Elmqvist.
Bee diversity along a disturbance gradient in tropical lowland forests of south-east Asia.
Journal of Applied Ecology, 2001, **38**: 180-192.

Bees are believed to be dominant pollen vectors in tropical forests, yet studies specific to bees in south-east Asia are rare. Regeneration and restoration of the rapidly disappearing lowland forests of this region are reliant on bees, thus there is an urgent need for forest bee data at the community level.

Bee communities of eight forested sites in Johor (Malaysia) and Singapore were surveyed three times each from February to August 1999 at the below-canopy level. These sites ranged from relatively undisturbed primary lowland dipterocarp forests to late secondary forests and exotic forests, including an oil palm plantation. The authors attempted to elucidate the environmental factors that correlated with the distribution of bees.

Bee abundance, in particular that of *Apidae*, was significantly higher in larger primary forests than other types of forests. However, bee species richness was higher in disturbed forests. The distribution of bees was apparently influenced by variables closely related to forest disturbance and resource abundance, such as the density of big trees (diameter at breast height 30–40 cm), temperature and flowering intensity of trees and shrubs.

The differences between the bee communities in forests of urban Singapore and primary forests in Johor may indicate that ecological processes in the forests of Singapore, in particular pollination, may be changing. However, pollination may not be totally intact in the primary forests surveyed, as their bee communities seemed to be depauperate.

Thus the study has a sting in the tale, so to speak. Whilst the study concludes that species diversity increases with disturbance, the bigger picture for the long term survival of tropical lowland forests is less comfortable. As stated at the start, such forests rely on bees for regeneration and restoration. The authors are aware of the limitations of the study sampling methods, but still conclude their paper by questioning whether there are enough pollinators surviving for the process of pollination to continue in forest fragments or regenerated logged forests.

K. Taylor, A.P. Rowland and H.E. Jones
Biological Flora of the British Isles – *Molinia caerulea (L.)* Moench.
Journal of Ecology, 2001, **89**: 126-144.

It is not often that these journal reviews include the Biological Flora of the British Isles but this species is so familiar to those involved in the management of rough pastures in the UK it could hardly be ignored This report, No 216 in the series, follows the now well established pattern with a distribution map on the 10km square of the National grid and also its distribution in Europe. This latter map takes some careful examination and would probably warrant the use of colours for clarity. The species is characteristically found in open, submontane grasslands and mires and the lighter phases of *Betula pubescens* woodland and in a substantial part of central and northern Europe. It has peaks of abundance on both highly acidic soils and calcareous soils of pH> 7.0. The species is often of concern because of its invasive properties, currently tending to replace *Calluna vulgaris* in substantial areas and its relatively poor palatability to grazing stock. Cattle rather than sheep will tend to keep it under control and, by preventing the build up of the characteristic matt of dead leaves, succeed in maintaining the grass in such a state that it is of relatively good nutrient value. The article is extremely detailed and, complete with over 100 references, would certainly be a good starting point for knowing more about this species.

M.M.P.D. Heijmans, F Berendse, W.J. Arp, A. K. Masselink, H. Klees, W.de Visser and N.van Breemen.
Effects of elevated carbon dioxide and increased nitrogen deposition on bog vegetation in the Netherlands.
Journal of Ecology, 2001, **89**: 268 – 279.

Within the context of global warming the starting point for this paper is that there has been a great deal of research on the effects of elevated atmospheric concentrations of on the growth of individual plants, but relatively little on the effects on natural vegetation. This was studied on a *Sphagnum*–dominated bog ecosystem in the Netherlands with both elevated CO_2 levels and increased nitrogen deposition. Elevated atmospheric CO_2 increased the height growth of *Sphagnum* magellanicum, the dominant *Sphagnum* species, in the second and third growing seasons. Vascular plant biomass was not significantly affected by elevated CO_2, but growth of species growing close to the moss surface was influenced negatively by the increased *Sphagnum* height. Elevated CO_2 did not change the allocation to below-ground plant parts.

Adding N increased above-ground vascular plant biomass. The shallow rooted species, *Vaccinium oxycoccus* responded most to the increased N deposition. *Sphagnum* growth was significantly reduced in the third growing season. This reduction was likely the result of increased vascular plant cover, given the observed negative relation between vascular plant cover and *Sphagnum* growth

As an interesting conclusion the authors state that the observed shifts in

species composition as a result of species – specific responses to treatments, and interactions between peat mosses and vascular plants will have important consequences for the sequestration of carbon in the bog ecosystem. For example a competitive advantage to *Sphagnum* will result in increased peat accumulation and thus C sequestration in the long term which feeds back to the CO_2 concentration in the atmosphere. Interestingly increased nitrogen appeared to have the opposite effect on Sphagnum biomass accumulation and hence on CO2 sequestration.

R. Singleton, S. Gardescu, P.L.Marks and M.A. Geber
Forest herb colonization of post-agricultural forests in central New York State, USA
Journal of Ecology, 2001, **89**: 325 – 338
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The disappearance of large tracts of pasture is a feature of a significant area of North America and indeed of Europe with the decline of traditional agricultural methods, most particularly grazing. The consequent appearance of substantial areas of secondary woodland is an opportunity but in the UK, is usually a good deal less herb rich than adjacent ancient woodland and the spread of species from ancient woodland is often slow. The paper surveyed Forest herbs at 25 sites where post agricultural forest occurred directly adjacent to old woods (forest that has never been ploughed). The authors reported that the abundance, richness and diversity of 50 forest herbs were, on average, lower in post agricultural forests than in old woods.

Thirty of 39 forest herbs that were found in at least four stands were less frequent in post agricultural forests than in old woods and some species had significantly higher frequency.

Species with rapid clonal expansion were significantly more frequent in post agricultural stands. Several species that were less frequent in post agricultural forests than in old woods showed decreases in density in post agricultural forests with increasing distance from the adjacent old woods.

M. Kery, D. Matthies and M. Fischer
The effect of plant population size on the interactions between the rare plant *Gentiana cruciata* and its specialized herbivore, *Maculinea rebeli.*
Journal of Ecology, 2001, **89:** 418 – 427.

This paper is of interest because it emphasizes the role of size of isolated populations of rare species. Many rare plant species are restricted to small isolated populations in which fitness may be reduced because of inbreeding, environmental and demographic stochasticity and reduced pollination. However specialist herbivores are less likely to be present in such populations because of higher probabilities of herbivore extinction and lower rates of colonization and may therefore affect fitness only in larger plant populations. The paper dealt with the relationship between the size of populations of the endangered grassland plant *Gentiana cruciata* and the probability of occurrence of population size of its specialist herbivore, the endangered butterfly, *Maculinea rebeli.* Looking at populations of the plant of various sizes, the authors concluded that the conservation of the butterfly requires the conservation of large populations of the plant.

Although large populations of *G. cruciata* produced more flowers, a greater proportion of their fruits were attacked by herbivores. Fruit herbivory, which considerably decreased the number of seeds per fruit, appears to have been caused by largely by *Maculinea*. The overall independence of *G. cruciata* seed production from population size may result from the opposing effects on fruit production and herbivory . The study suggests that complex interactions between different trophic levels may determine the population dynamics of rare species . Furthermore small population size may have both negative and positive effects on the fitness of species. Conservation efforts aimed at increasing the area of suitable habitat for *G. cruciata* might also increase the likelihood of the occurrence of *M. rebeli* because at least one unoccupied site was colonized from a distance of several kilometres.

T. Lennartsson and J.G. Oostermeijer
Demographic variation and population variability in *Gentianella campestris:* effects of grassland management and environmental stochasticity
Journal of Ecology, 2001, **89**: 451 – 463.

This paper is a rather complex mathematical treatment of the subject but it provides evidence that traditional grassland management is more favourable for *G. campestris* than the methods which prevail in Scandinavia today. This traditional method in Scandinavia would be known in the UK as hay cutting and grazing the aftermath and was also a traditional form of management and is still practised by conservationists in some areas.

Continuous summer grazing, the current prevailing management strategy in Scandinavian grasslands, resulted in a high recruitment of new plants, mainly because litter accumulation was prevented and gaps were created by trampling. Trampling and repeated grazing , however caused damage which reduced seed production.

Mowing in mid-July increased seed production, but litter accumulation following regrowth of the vegetation prevented establishment.

Mowing in October promoted recruitment because of low litter accumulation, but the seed output decreased because plant growth was impaired by tall vegetation.

Mid-July mowing followed by autumn grazing (the historical management regime) yielded high valued for both seed production and establishment of rosettes

D.B. Roy, P. Rothery, D. Moss, E. Pollard and J.A. Thomas
Butterfly numbers and weather: predicting historical trends in abundance and the future effects of climate change.
Journal of Animal Ecology, 2001, **70**: 201-217

This study examined how variations in weather have effected the size of British butterfly distributions. The study was based on the Butterfly monitoring Scheme (BMS) which is a national database that has measured butterfly abundance since 1976. 31 species were studied and for 28 of them strong associations were recorded between weather and fluctuations and trends in populations. The authors constructed models based on 15 years of data between 1976 to 1990. These incorporated weather variables and density effects. The models whilst achieving good a good fit with the observed data were less good at predicting change in the period 1990 to 97. The parameter values of the models were adjusted using the 22 year data set from 1976 to 1997 and the most accurate models for 8 species were used to predict changes over the past two centuries from 1767 to 1997 using historical weather data. For three species, marbled white, gatekeeper and wall brown it was possible to compare predicted past trends with accounts of abundance since 1800.

For each species the comparison was good. Models were also used to predict future changes in abundance based on three published climate change scenarios. Of the 8 species modelled, four were predicted to show mean population increases with warmer summer temperatures, one, the cabbage white was predicted to decline and the others remained stable. The poor success of the initial models in predicting fluctuation between 1991 and 97 is discussed by the authors who describe the results of the analysis as a salutary lesson. This is because butterflies were considered among the most promising groups of invertebrates for short-term prediction of the effects of climate change. The authors discuss a number of reasons why they had such limited success in the predictions for this time period of 7 years and conclude that the models are adequate to predict qualitative rather than quantitative long –term changes and that this may be all that is obtained from models using correlations between BMS data and weather data.

R. Moss, J. Oswald and D. Baines
Climate change and breeding success: decline of the capercaille in Scotland.
Journal of Animal Ecology, 2001, **70**: 47-61

This study was concerned with the hypothesis that climate change has caused lower breeding success in capercaille in Scotland. Previous studies have shown that low breeding success combined with the death of adult birds flying into forest fences has been the primary reasons for decline since 1970. The study examined the period 1975 to 1999 and correlated mean temperatures during the study period to breeding success. Generalised linear models were used to investigate the effects of weather measurements on three aspects of breeding success: number of chicks per hen, proportion of hens with a brood and brood size. The weather variables used in the study were mean daily maximum and minimum temperature, rainfall and the number of rainy days. Two specific areas were studied; the Spey Valley and Glen Tanar. In both cases hens raised more chicks when April temperatures rose earlier, when late May was warmer and when early June was warmer and drier. The authors suggest that the early rise in temperature in April stimulates timely plant growth so improving the laying hens nutritional intake and the viability of the chicks. Hens also raised more chicks when late May and when early June temperatures were higher and when there were fewer rainy days. The authors suggest that this may be due to more successful foraging by chicks in warm dry weather. The authors also consider the relationship between the hatching and maturation of chicks and the availability of food, in particular moths. It is suggested that warmer springs are leading to a mistimed hatching that is no longer correlating with maximum food availability.

Capercaillie

T. Bohlin, J. Pettersson and E. Degerman.
Population density of migratory and resident brown trout (Salmo trutta) in relation to altitude: evidence for a migration cost
Journal of Animal Ecology, 2001, **70**: 112-121

This study of migratory and resident populations of brown trout in Sweden investigated two hypotheses: (a) that altitude has a stronger effect on juvenile density in migratory compared to resident populations, and (b) that juvenile density is larger in migratory than in resident populations. Using multivariate methods of analysis on electrofishing data from 164 sea-migratory populations and 167 stream-resident populations tested these two hypotheses. The analysis considered a range of interactions including type of watercourse, depth, width, altitude and presence of other fish species. The results supported both theories; i.e. that juvenile density was larger and declined more rapidly in migratory compared to resident populations. The results showed that all environmental factors included in the analyses, except the density of other fish species (non-salmonids) had significant effects on the density of young trout, but the strongest were the depth of the water course and the type of watercourse. This would suggest that other characteristics other than those used in the analysis are likely to be affecting recruitment. Depth, as in other studies, was found to be negatively correlated to recruitment. The authors discuss a range of factors affecting recruitment and also consider relationships between adult size/age and stream characteristics. They conclude that the results of the study suggest that fitness of sea-migrant trout declines with altitude relative to fitness of resident trout which linked to a positive relationship between adult size/age and stream characteristics supports the hypothesis that the migration strategy selected is determined by migration costs increasing with altitude.

R. S. Hames, K.V. Rosenberg, J.D. Lowe and A. A. Dhondt
Site reoccupation in fragmented landscapes: testing predictions of metapopulation theory.
Journal of Animal Ecology, 2001, **70**: 182-190

This research used data from a 3-year study on the effects of habitat fragmentation on the Scarlet Tanager, a long-distance migrant forest bird of North America to investigate predictions from metapopulation theory. In particular that local extinction and recolonisations should result in the most fragmented sites being infrequently occupied and the least fragmented sites being continuously occupied by sensitive species. Metapopulation theory also predicts that the probability of extinction is negatively correlated with patch size and the amount of habitat in the landscape. Conversely recolonisation is predicted to be negatively correlated with the isolation of the patch and positively correlated to the amount of habitat in the landscape. The authors used Principal Components Analysis (PCA) to determine a measure of fragmentation. This was subsequently used in a logistic regression to predict the number of years that territorial males would occupy a site. The authors also used patch size and isolation, proportion of forest and forest/non-forest edge as measures of fragmentation. Which were also used in logistic regressions to predict the probabilities of local extinction and recolonisation. The authors found that local extinctions were negatively correlated with patch size and the amount of forest in the landscape as predicted by metapopulation theory. Recolonisations were also negatively correlated with isolation of patches also as predicted. Recolonisations however were also negatively correlated with the amount of edge habitat in the landscape. The authors conclude that the result suggest that stochasticity may drive extinction, but that habitat selection may play an important role in recolonisation.

News In Brief

ET 2001 The environment for business, 5th - 7th June 2001

For the last few years the National Exhibition Centre has hosted this exhibition and series of seminars. It brings together a large number off Companies and organisations - over 150 as exhibitors but who work primarily in the industrial side of the environment. There is usually strong emphasis on water and water engineering, pumps filters etc. and waste disposal and the field ecologist may have to look to find much of interest. A feature of recent years has been the session known as talkback - modelled on the BBC programme Question time which this year had the theme Is current corporate practice diminishing the wealth of nations?. There was a session by Project Acorn on environmental Improvement through supply chain management Then there were sessions on Air pollution, waste disposal, sustainability and the Climate change levy on which IEMA held a seminar. This is now an annual event and anyone looking for an industry view of current environmental issues would find this worthwhile.

Lantra's Skills Foresight Report 2001 - A dialogue for Action

Lantra National Training Organisation have recently produced a substantial review of the skills situation for those in the Land based industries. It reports a substantial shortfall in the skills required. In agriculture, a third of the workforce is aged 55 or over

Better management and business skills are required, particularly for the high number of owner/managers in the sector. Basic ICT, key skills, initiative and problem solving skills are required by all who work in the industry With 140 pages and 10 appendices, this document requires careful reading About 1.5 million people and 360,000 businesses operate in the range of industry areas covered which included agricultural crops and livestock, production horticulture, landscaping, environmental conservation, game conservation, fish farming, agricultural and garden machinery, fencing, floristry, animal care, equine and professions allied to veterinary science. Of this total, environmental conservation represents 5.9% of the total employment. Copies of the report are available from Lantra National Training Organisation, Lantra House, NAC, Kenilworth, Warwickshire, CV8 2LG.

Email: connect@ lantra.co.uk

Note: IEEM is represented on Lantra by Stewart Lowther of the Training, Education and Career Development Committee.

Developments in London

The London Plan is in process of development as a part of the Mayor's Spatial Development Strategy. Apparently two thirds of London's land area is green spaces and water. Of this one third is in parks or sports use and a further third comprises heathlands, grasslands, woodlands and rivers. London has 33 SSSI's, 1,500 species of flowering plants and 300 types of birds.

The proposed policies for the London Plan are to:

Protect Green Belt, Metropolitan Open Land, important wildlife sites and locally important open space;

Protect and enhance important wildlife habitats;

Encourage the re-use and regeneration of London's legacy of brown-field land;

Identify a network of strategic open spaces and green chains that could be protected and enhanced;

Ensure that new open spaces are created where there is inadequate provision; Promote strategic walking routes and encourage the development of links to fill gaps in the current networks.

All in all this is an ambitious and very positive programme about which no doubt more will be heard.

News from the European Community

On 24 January, 2001 The European Commission adopted a proposal for a new environmental strategy outlining priorities for action on the environment for the next 5 - 10 years Entitled 'Environment 2010: our future, our Choice' - the sixth Environment action programme of the European Community outlines four priority areas: Climate Change, Nature and Biodiversity, Environment and Health and Natural Resources and Waste. A summary of the Sixth Programme can be found at http://www.europa.eu.int/comm/environment/newprg/index.htm.

On 27th March the Commission adopted four sectorial Biodiversity Action Plans under European Community Biodiversity Strategy. The four specific sectoral Action Plans cover : Conservation of Natural resources, Agriculture, Fisheries and Economic Development Co-operation. More information on the Biodiversity Action Plans can be found at http://biodiversity chm.eea.eu.int.

The IUCN European Office ERO

IEEM is a member of IUCN and the office receives regular mailings on items of news. Anyone interested should visit the website - http//www.iucn-ero.nl. The latest edition contained the following item:

Environmental Communication Award

The European Nature Heritage Fund (IUCN member) and the Bellagio Forum for Sustainable Development launched an international award for exemplary media work in Environmental Conservation and Sustainable Development. All forms and formats of media work are eligible. All those who operate in the media (including artists, NGOs and press offices) can submit or suggest entries. Nominations should be sent to the Bellagio Forum, E-mail: info@bfsd.org or Euronatur, E-mail: info@euronatur.org by 1 August 2001. (Laura PEDROTTI) Contact: guest@iucn-ero.nl.

Introduction of the natterjack toad

CCW reports that toads from Merseyside have re-populated former strongholds in sand dunes around Talacre, with the help of the Herpetological Conservation Trust. Natterjack toads were last recorded on the North Wales coast during the 1960's but they died out due to the loss of breeding and feeding areas because of building and tourist development pressure and human disturbance.

Several pools were created at Talacre with the help of BHP Petroleum. Spawn was then transported from Merseyside and, with the help of Flintshire Countryside Service rangers and volunteers, the result is that around 100 individuals now live in the area.

Dibden Bay, Southampton Water

Associated British Ports has proposed a container terminal which will require removal of foreshore by dredging and the building of port handling facilities, transport infrastructure and related developments. This is an issue which is likely to get a great deal more lively in the run up to the public enquiry later this year. The site comprises 42 hectares of mudflat within the Solent and Southampton Water Special Protection Area and Ramsar Site and another 34 hectares just outside.

IEEM Patron petitions for the Antarctic

IEEM Patron and WWF ambassador, Robert Swan, is hoping through the internet, to amass 3 - 5 million signatures in support of the preservation of Antarctica as the last great wilderness on earth. This will be presented to the Rio + 10 Earth summit in Johannesburg next year. Anyone interested in signing should visit the website http://www.missionantarctica.com.

Scottish Biodiversity Week

Following the successful pilot of the Fife Biodiversity Week last September, a number of other LBAP groups in Scotland have decided to run a Scottish Biodiversity Week on 8 - 16 September. Details of the various LBAP groups involved are available from Vicky Abernethy:

Tel: 0131 311 6500 or vicky.abernethy@rspb.org.uk.

Recent Publications

Climate Change The UK Programme, DETR

This is a substantial publication which is valuable reading for those wishing to know more about this crucially important issue. Certainly criticism of President George W Bush does promote the question - well what is the UK doing about it?. This volume will certainly shed light on the issue. Its 209 pages are divided up into 5 sections - The UK's strategy, Delivering Emission Reductions, Adapting to the impacts of Climate Change in the UK, Action by the Devolved Administrations and 10 annexes.

In the section on adapting to the impacts of climate change in the UK is to be found the impact on biodiversity - this is stated to be 'difficult to forecast because of the uncertainties of climate change, the complexity of natural ecosystems and the lack of information about the action that might be taken across the UK to adapt to climate change' - perhaps a little thin!

There is a wealth of information in this publication and it is well laid out with numerous graphs and illustrations.

Available from: DETR, Eland House, Bressenden Place, London SW1E 5DU £25.00. Also on the website www.environment.detr.gov.uk.

The State of the Countryside 2001 - The Countryside Agency ISBN 0 86170 650 1

This is the annual report of the Countryside Agency written just after the outbreak of Foot and Mouth Disease. It puts a positive slant on the Countryside despite the recent problems.

There are 9 sections which together with appendices and maps amount to 84 pages. The sections are: introduction, land and the environment, people and communities, incomes education health and crime, services and housing, economy and employment, transport and travel, recreation and access and attitudes. Overall the report shows that there is an underlying crisis in agriculture which is now heightened by the outbreak of FMD; there are pockets of serious rural deprivation and declining availability of some essential services; the former steep decline in many aspects of the rural environment has slowed down ; the quality of life for many living in rural areas is good.

Available from : Countryside Agency Publications, PO Box 125, Wetherby, West Yorkshire LS23 7EP Tel: 0870 120 6466

E-mail: countryside @twoten.press.net.

Conservation, Access and Recreation 1999 - 2000 Report - The Environment Agency

This is the fourth such annual report from the Environment Agency and is well worth looking through for the truly impressive range of activities that are carried out. It starts with the national picture under the following headings: Recreation, Conservation, Fisheries and Navigation. Under Conservation it deals with the UK Biodiversity Action Plan, research and Development, River Habitat Survey, the new Riverside Explorer CD-ROM and Collaborative Projects. The Riverside Explorer CD-Rom has been distributed free to all 28,000 schools in England and Wales.

The report goes on to deal with specific examples of successful projects throughout the regions under the categories of Implementing Biodiversity Action Plans, Conservation Access and Recreation, Social Inclusion, Surveys, Fisheries, Recreation, Conservation and Navigation, and finally River Restoration and Re-engineering.

Available from: The Environment Agency, Rio House, Waterside Drive, Aztec West, Almondsbury, Bristol BS32 4UD.

Tel: 01454 624 400.

Wildlife in Church and Churchyard by Nigel Cooper, MIEEM Church House Publishing, ISBN 0 7151 7587 4

The value of churchyards for wildlife conservation has long been recognised if the evidence has been somewhat anecdotal.

This compact book by Nigel Cooper, MIEEM, combines in balanced fashion an emphasis on spirituality with practical guidance and is arranged in eight chapters. It deals not just with churchyards but also with the wildlife that may occur within the church, not all of it particularly welcome - the death watch beetle, feral pigeons, rats and mice and bats to mention but few. The second chapter - How to manage the churchyard is a particularly useful statement of the principles that need to be followed. Grassland management has a separate and necessary chapter as does Trees , hedges and woodland and finally there is a section on Landscape design, an aspect certainly not be neglected in this context. All in all this is a most useful book for those with an interest in the field.

Available from: Church House Publishing, Church House, Great Smith Street, London SW1P 3NZ Price: £9.95

National Vegetation Classification: Field guide to Woodland by J.E. Hall, K.J. Kirby and A. M. Whitbread ISBN 1 861097 5235.

This handy volume produced by the JNCC and with input by IEEM members is one of a new series of interpretative publications intended to support users of the NVC. It is confined to England, Wales and Scotland including the Isle of Man and the Scilly Isles but excluding Northern Ireland. Orkney and Shetland are also excluded as there are no records there for any woodland type in the NVC Woodland Database.

It then goes on to give a brief description of each of the 18 communities and sub communities. Each is accompanied by a useful distribution map. Finally there are six appendices, the first one relating the NVC classification to other systems where this applies and which is particularly useful in relation to the Habitats Directive.

Available from: JNCC, Monkstone House, City Road, Peterborough PE1 1JY Price: £10.

Coastal Dune Management - shared experience of European Conservation Practice. Liverpool University Press. Edited by J.A. Houston, S.E. Edmondson and P.J. Rooney. ISBN 0-85323-854-5

Edited by three Full Members of IEEM , this book is a major compendium of information on sand dunes - the proceedings of a Symposium held in Southport in 1998. The book is set in the context that for centuries in Europe, there has been a human imperative to stabilize sand dunes. From the Middle ages to the present day, legal instruments have been employed to control sand movement, build sand dykes and find uses for the 'wastelands'. In recent years a new European view has emerged, an approach that respects the value of dune systems to society as natural sea defences, wildlife refuges and recreational areas. This new approach is explored within the context of European legislation and the increasing recognition of the role of local people in decision making. The reports are far ranging and cover many parts of Europe. It is perhaps a pity that the paper on Dune Management on the Atlantic Coast of France predated the massive damage done in the storm of late December 1999 to the well known plantings of *Pinus maritima* which were originally planted to stabilize the dunes. This damage would certainly have extended to the dunes themselves and it would be interesting to know how this is being handled.

Starting with a keynote paper - Coastal dunes: resultant dynamic position as a conservational managerial objective by William Ritchie, the rest of this 458 page book is broken down into 6 sections - Working with Geomorphological Processes, Nature Management, People and Dunes, The Sefton Coast Life Project, International and National Priorities: strategy and implementation, and finally Monitoring: methods and applications. At a very reasonable price of £23.99, this book should be in the collection of anyone with an interest in Dunes and their current and future management.

Available from: Liverpool University Press, 4, Cambridge Street, Liverpool L69 7ZU.

Institute News

Birmingham 2001

Over 100 delegates attended the Conference in Birmingham on the new Countryside and Rights of Way Act and its implementation.
We were treated to a first class collection of papers which dealt in considerable depth with the subject. The keynote address was given by David Arnold-Foster, the Chief Executive of English Nature, whose wide ranging and illuminating talk was appreciated by all. As is usual with an IEEM Conference, questions and discussion flowed freely and most delegates went away feeling that they had had a good immersion in the subject. Our thanks go to the speakers who prepared such excellent material and Dr. Peter Beale, aided by Dr. John Box who assembled the programme. It is hoped to publish the proceedings in due course. It looks as though Birmingham remains a popular venue with the membership and thoughts are now turning towards a suitable theme for a one-day conference in 2002. The main suggestion so far has been aspects of Urban ecology.

Discussion Session with Andrew Barlow, David Arnold-Foster and David Hill

The 2001 Professional Development Programme

The programme for this year has proved more popular than in more recent years. The Foot and Mouth Disease outbreak has made a real impact in that several courses have had to be postponed and attendees contacted to find alternative dates. On the whole this has worked smoothly but has been considerable extra work for the Secretariat and the Courses supervisors, to whom as always, we are very grateful. Those courses which are not so far full and which may have changed dates are listed in the diary section and also in the website.

The 2002 Professional Development Programme

Members of the Training, Education and Career Development Committee and the Secretariat are now starting work on the programme for next year. Offers on appropriate topics would be warmly welcomed. The Institute issues guidance notes to supervisors and handles most of the administration, leaving the course supervisors with the task of organizing the day. An appropriate fee is payable to course supervisors. IEEM is conscious of the small amount of identification skills taught in Universities these days and is keen to provide opportunities for those skills to be developed. Offers on groups of species not recently covered would be most welcome. The Institute also tries to offer a certain number of sessions each year to enhance the Professional Skills - contracts, public enquiries, briefs etc.

CPD - It's on its way

Both the Professional Affairs Committee and the Training, Education and Careers Development Committee have been working on this topic and new regulations are expected to be considered at the next Council Meeting with a view to becoming operative from the start of the new membership year. CPD has been a requirement of members for some time but the idea now is to make this a more formal matter and also to provide guidance and encouragement to members as to how this might be carried out. The first thing to bear in mind is that most members will already be undertaking CPD and the amount will almost certainly be well in excess of their perceptions. The Institute is proposing 20 hours per year and a system is expected to be introduced for keeping proper records and making these available for inspection.

Committee Matters

There were unfortunately one or two errors in the Committee contacts and details given in the last edition.The correct E-mail addresses for those concerned are shown below - apologies.
Colin Buttery, Treasurer: cbuttery@westminster.gov.uk. Dr. Alex Tait, Vice President is also a member of the Finance and General Purposes Committee. The E-mail address for Kim Harding in the Scottish Section should now be: harding_k@yahoo.com and Richard Graves of the Membership Admissions Committee should now be richard.graves@metcalfeddy.co.uk The MAC is fully stretched at the moment and would welcome further members especially from Local Government, the Statutory Agencies or the voluntary sectors. Please contact the secretariat if you are willing to help.

Membership Subscriptions

I am afraid the time is drawing near to think about the membership renewals due on 1st October. Last year's appeal for members to pay by direct debit was quite successful but there are still a number of members who, often several years in succession need more than one reminder. The rate of renewal is usually very high and nearly all members get there in the end. It would avoid any embarrassment that repeated reminders may cause as well as removing an unnecessary administrative exercise from the Institute if more people could pay by Direct Debit and especially those habitual late payers. Direct Debit forms are available from the IEEM Office.

Relations with other Institutions

Negotiations with other Institutions have been progressing if somewhat slowly and we have now reached the point of signing up to a Memorandum of Understanding which will carry the issue forward. There are considerable advantages in more closer working and this may provide the means for members of IEEM to become chartered. A great deal of work has been put into this concept which may at last be beginning to bear fruit. Any Constitutional changes required will have to be approved by Council and may well require the approval of the membership through a special meeting.

IEEM looks eastwards

Unfortunately the collaborative bid through the PHARE programme in Poland was not successful. Apparently there were over 100 bids from Poland and only 27 were accepted. Much of the work in putting the bid together was undertaken by Martin Cahn and IEEM is very grateful to him for his efforts. No doubt other opportunities will present themselves in the future.

10th Anniversary Celebration

Do not forget that the 10th Anniversary of the Institute will be on 26th September 2001. A reception has been arranged at the Royal Geographical Society in the evening and it is hoped that many members will attend and make this a memorable occasion. Details will be sent out to all members in due course.

Autumn Conference and AGM

The next 2-day Conference and AGM will take place on 28 & 29 November 2001 and will be based at the Grand Hotel in Torquay. A Local team of three members, Dr. Peter Beale, Dr. Eirene Williams and Andy Nisbet are working on the programme so be sure to put this in your diary now. **The AGM will be held at the Grand Hotel, on 28th November at 17.30.**

Geographic Sections

Following the production of the Directory, members will now have an easy opportunity to see how many members there are in each Geographic Section. This raises the possiblity that more sections could be established. Paul Rooney is keen to help in setting up a section in the North west and if anyone else is interested could they please contact him on E-mail: rooneyp@hope.ac.uk.

Scottish Section

The recent event held by the Scottish Section is reported in detail elsewhere in this bulletin but it is extremely encouraging that it was such a successful meeting and that the Scottish Section is making such excellent progress. Look out for the programme of the Autumn Meeting soon.

Careers Fairs

The Secretariat gets regular requests for people to attend careers fairs for students and school leavers and occasionally we are able to oblige. This usually requires attendance for a few hours at the fair and to talk to students and to answer questions about a career in ecology. This is best be done locally so anyone who would like to volunteer would be most welcome. We could then establish a register so that the Institute could respond more effectively.

Foot and Mouth Disease

Overshadowed by the election it is easy to forget that the outbreak is by no means over although substantial progresss has been made. The odd outbreak here and there can, however, have a devastating effect on activities. As an indicator of member activity there has been a sudden drop in phone calles to the office which is a sure sign that survey work is returning. It is clear however that many members will not be able to make up for lost work - the opportunities may have passed or there are simply not enough hours in the day left.

Recent Conferences.

Work is now virtually complete on both the Conference in Ayr on the Rural Economy and the Conference in Birmingham on Invasive Species. Both are expected to be with the printers shortly and will be sent out to all members.Penny Legg has now completed editing the proceedings of the Ayr Symposium and Paul Bradley has completed the proceedings of the Birmingham Symposium on Invasive species.The Ayr Symposium is very timely in view of the discussions about the future of agriculture and the whole rural economy following the FMD outbreak and also, Invasive Species continue to be a topic rarely far from the ecological headlines.

Future Editions of In Practice

Readers of In Practice will know that I make regular pleas for papers and to a large exent these have been answered. At a recent Committee meeting it was suggested that we run a regular feature - probably no more than one side- on 'a day in the life of'. IEEM members are engaged in such a wide range of activities and come from such a wide variety of backgrounds that the results are likely to be quite revealing. It would also be a useful indication to student members what they might actually expect to do after graduation. Anyone wishing to offer such a contribution should contact the Secretariat beforehand

IEEM GUIDELINES ON ECOLOGICAL IMPACT ASSESSMENT

Karen Regini, MIEEM

The objective of the Steering Group, which is co-ordinating the production of these guidelines, is to utilise the experience of as wide a range of ecological practitioners as possible. All ecological practitioners are therefore asked to comment on the working draft, as it progresses. It is available on the IEEM web page: www.ieem.org.uk.

The working draft is being prepared by the Steering Group. A member of the Steering Group has or will add the relevant chapter after each of the following meetings:

Scoping	31.1.01	(Jo Treweek)
Jo@treweek.fsnet.co.uk		
Valuation	23.5.01	(Richard Knightbridge)
knigr@entecuk.co.uk		
Consequence	18.7.01	(Nic French and Mike Oxford)
nic@epr.uk.com,		Mike.oxford@n-somerset.gov.uk
Significance	22.8.01	(Helen Byron and Mick Hall)
helen.byron@rspb.org.uk,		mjhall@ctrl.co.uk
Implications	26.9.01	(Mike Oxford and Karen Regini)
Mike.oxford@n-somerset.gov.uk,		info@cpm-uk.co.uk

In addition to the new chapters, the existing chapters will be amended progressively throughout the process. Please send your comments by email to the author(s) of the relevant chapter, with a copy to Karen Regini.

A pilot draft of the Guidelines will be issued at the autumn IEEM Conference (November 27 – 29) to those who wish to take part in testing it. It will be available to any interested ecologist after the Conference. The draft Guidelines will be amended in response to comments from those who tested them and through discussion with organisations with special expertise in ecological impact assessment.

Numerous agencies will have promised to make an input to the process, including: English Nature, Scottish Natural Heritage, the Scottish Environment Protection Agency, and the Environment and Heritage Service for Northern Ireland. We hope also to involve the Countryside Council for Wales, the Environment Agency, the Biodiversity Secretariat in DETR and the Highways Agency. Many non-statutory organisations such as ALGE (the Association of Local Government Ecologists) and the RSPB are also committed to the Guidelines and some are represented on the Steering Group. Interest has also been shown from ecologists in the republic of Ireland.

It is hoped that these organisations will feel able to ratify the Guidelines, thus giving ecological practitioners guidance in which they can place confidence, a rare commodity in this world of rapidly changing ecological policy and legislation.

We intend to launch the Guidelines in early Summer 2002. However, that will not be the end of the process, as the Steering Group believes they should be subject to periodic review, to incorporate new thinking in this developing field.

Should you wish to join the working party, which receives the minutes of the Steering Group meetings and other information about progress, please contact Karen Regini by email. All interest is registered and names added to the circulation list, even if personal responses to emails are very slow!
Karen Regini
E.Mail - info@cpm-uk.co.uk

Prospective members of IEEM

The following people have applied for membership of IEEM. If any existing member has any good reason to object to someone being admitted to the Institute, especially if this relates to compliance with the Code of Professional Conduct, they must inform the Executive Director by telephone or letter before 1st August 2001.
Any communications will be handled discretely. The final decision on an admission is always taken by Council.

F=Full A=Associate

Name			Category applied for
Ms	Ione R.	Bareau	F
Mr	Alistair	Baxter	F
Prof.	J.Nigel B.	Bell	F
Miss	Alison C.	Bennett	F
Ms	Julie N.	Brownbridge	F
Mr	Peter J.	Carpenter	F
Miss	Rachel	Cook	A
Mr	Peter A.	Edwards	F
Ms	Tammy	Edwards	A
Mr	James	Farrell	F
Mr	Roger M.	Featherstone	F
Mr	Frank	Fortune	F
Mr	Terry	Franklin	F
Mr	Peter H.	Gondris	F
Dr	David J.	Hackett	F
Miss	Dawn E.	Hardy	A
Dr	Miles G.	Hoskin	F
Mr	Peter	Hoy	A
Mr	Kieron R.	Huston	F
Mr	John	Jones	A
Mr	Alan J.	Lawrence	A
Mr	Andrew	McNaught	F
Mr	Mark	Mifsud	A
Mr	Robert I.	Mungovan	F
Dr	Stephen E.	Mustow	F
Mr	Graham.	Myers	F
Dr	Albert S.	Nottage	F
Mr	David P.	Pape	F
Miss	Ester C.	Pawley	A
Mr	Matthew	Pickard	A
Mr	Jonathan	Price	A
Ms	Anna V.	Prichard	F
Mr	David A.	Revill	A
Miss	Phillipa L.	Reynolds	F
Ms	Elaine C.	Richmond	F
Dr	Glen	Robson	F
Miss	Eleanor J.	Shield	F
Miss	Katrena	Stanhope	A
Mr	David J.	Stanton	A
Mr	Anthony J.	Stones	F
Miss	Claire A.	Vetori	A
Miss	Karen E.	Vowles	F
Miss	Kirsten A.	Walker	F
Mr	Mark	Watson-Jones	F
Mr	Christopher C.	Wedge	A
Mr	Michael J.	Woods	F
Mr	Stephen R.	Woolnough	A
Mr	Ian M.	Yarham	F
Mr	Timothy C.	Youngs	F

New Admissions to IEEM

IEEM is pleased to welcome the individuals listed below who have now been admitted as new members.

Name			Grade admitted
Mr	Richard	Arnold	F
Miss	Helen	Ball	A
Dr	Jonathan	Bernard	A
Ms	Amanda	Best	F
Mr	Stephen	Bradley	F
Mr	Ian	Butterworth	F
Mr	Carl	Cornish	F
Mr	Robert	Craig	F
Mr	Andrew	Cross	A
Ms	Eula	Eliades	A
Ms	Frances	Farrugia	F
Miss	Ann	Fells	F
Mr	Tobias	Fisher	A
Dr	Julie	Fossitt	F
Ms	Alison	Glaisher	F
Miss	Rachel	Hacking	A
Miss	Karen	Hall	A
Mr	Keith	Hutcheon	F
Mr	David	Ivison	F
Mr	Kevin	Jeanes	F
Miss	Lorraine	King	F
Mr	Thomas	Knight	F
Mr	Keith	Lawton	A
Miss	Amy	Medlicott	A
Miss	Jo-Ann	Mosley	A
Mrs	Carole	Newberry	A
Mr	Ewan	Nugent	A
Miss	Helen	Powell	A
Mr	Martin	Robinson	A
Mr	Michael	Robinson	A
Mr	Timothy	Ross	A
Mr	Thomas	Sanders	F
Mr	Christopher	Slack	A
Mr	Paul D.	Smith	F
Miss	Johanna	Waesch	A
Ms	Christie	Webster	A
Mr	Simon	Weymouth	A
Dr	Janine	Wilkins	F
Mr	Robert	Yaxley	F
Mr	William	Yorke	F
Mrs	Linda	Yost	F

The following have successfully upgraded their membership from Associate to Full

Mr	James	Ede	F
Ms	Janet	Imlach	F
Mr	Tim	Sykes	F

Courses/Events in the next few months:

10 - 13 July. 11th International Symposium: Pollutant reponses in Marine Organisms, Plymouth
Details from: Marine Biological Association, The laboratory, Citadel Hill, Plymouth PL1 2PB. Tel: 01752 633331, Fax: 01752 669762
E-Mail Sec@mba.ac.uk.

15July. Today's solutions, tomorrows problems? - pressures on protected landscapes, Norwich.
Details from: National Association for Areas of Outstanding Natural Beauty, contact Jill Smith Tel: 0451 862007.

16 - 20 July. Detecting Environmental Change: Science and Society, London
Details from: Dr. Catherine E Stickley, Environmental Change Research Centre, Department of Geography, University College, London, 26 Bedford Way, London WC1H 0AP. Tel: 020 7679 5562, Fax: 020 7387 7565. E-mail: c.stickley@ucl.ac.uk.

18 July. Green and Pleasant Land - Countryside Recreation and Sustainable Development, London.
Details from: RTPI. Tel: 0113 246 5714.

19 July. Restoring and creating Wildflower-rich grassland on farmland, Shalbourne, Nr Hungerford
IEEM Professional Development Programme.Details from IEEM.

23 - 27 July. Our Protected Past - management of the historic environment in Europe's national parks and protected areas, Exeter.
Details from: UNPA, E-mail: opp-conference@exeter.ac.uk.

23 - 26 July. Fern Flora Worldwide - Threats and Responses. A British Pteridological Society and Species Survival Commission, IUCN World Conservation Union International Symposium, Guildford, UK. Details from: Clive Jermy, E-mail c.jermy@cwcom.net.

26July. Managing an Urban Fringe Heathland, Canford Heath, nr. Poole.
IEEM Professional Development Programme.Details from IEEM.

30 July. The First International Conference on Distance Sampling - Estimating wildlife Abundance for Ecology, management and Conservation,St Andrews, UK.
Details from: Rhona Rodger, Tel: 01334 463228,
E-mail: rhona@dcs.st-and.ac.uk.

31 August - 4 September. 7th European Heathland Workshop, Orkney.
Details from: N.R. Webb, CEH, Winfrith Technology Centre, Dorchester, Dorset DT2 8ZD. E-mail: nrw@ceh.ac.uk.

4 - 13 September. Irish Raised Bogs, Conservation, Utilisation and After-Use, Study Tour, Ireland.
Details from: IPCC, 119 Capel street, Dublin 1, Ireland. Tel/fax 00353 1 8722397

5 - 8 September. Hedgerows of the World: Their Ecological Functions in Different landscapes, Bimingham.
Details from: Colin Barr. E-mail: cjb@ceh.ac.uk.

10 - 12 September. The State of Scotlands's Environment and Natural Heritage, Heriot - Watt University, Edinburgh.
Details from: Mrs Helen G. Forster, Chief Scientists Unit, SNH, 2, Anderson Place, Edinburgh EH6 5NP. Tel 0131 446 2420, Fax: 0131 446 2406, E-mail: helen.forster@snh.gov.uk

11 September. Applying New Technology to Conservation Management Information, Bath Spa University College, Bath
Details from Dr David Watson, Bath Spa University College, Faculty of Applied Sciences, Newton Park, BATH, BA2 9BN.
Tel: 01225 875755. Fax: 01225 875776.
Email: d.watson@bathspa.ac.uk.

11 -13 September. Changing Wetlands: New developments in Wetland Science, University of Sheffield
Details from: Dr Andrew Baird, Sheffield Wetlands Research Centre (SWERC) , Department of Geography, University of Sheffield, Sheffield S10 2 TN. E-mail: wetlands@sheffield.ac.uk.

12 September. Restoration and Creation of Dwarf Shrub Heathland and Moorland, Peak District .
IEEM Professional Development Programme.Details from IEEM.

17 - 19 September. 6th National Heathland Conference, Dorset.
Details from: Jenny Goy, RSPB, Suite 7b, Ryan House, Ryan Business Park, Sandford Lane, Wareham, Dorset BH20 4DY.
E-mail: jenny.goy@rspb.org.uk.

19 September. Reedbeds, Bitterns and Biodiversity, Lee Valley
IEEM Professional Development Programme.Details from IEEM.

21 September (revised date). Managing Native Broadleaved Woods, Wye Valley/ Forest of Dean
IEEM Professional Development Programme.Details from IEEM.

22 - 26 September. Tree Rings and People, Davos, Switzerland .
Details from: Dr Paolo Cherubini, Swiss Federal Research Insitute WSL, Postfach, CH 8903 Birmensdorf, Switzerland
Tel: 0041 1 739 22 78, Fax: 0041 1 739 22 15,
E- mail: paolo.cherubini@wsl.ch.

26 September. Executing Environmental Projects on the Ground, Poole area.
IEEM Professional Development Programme.Details from IEEM.

26 September. IEEM 10th Anniversary Celebration, Royal Geographical Society, London

4 October. Making Management Plans that work for you, Merseyside
IEEM Professional Development Programme.Details from IEEM.

11-12 October Autumn Members Day: New Legislative Instruments in Scotland. IEEM Scottish Section Meeting

19 October. British Ecological Society Forest Ecology Group - Conservation and management of the New Forest into the 21st Century, The New Forest.
Details from: Jonathan Spencer, Forest Enterprise, Queen's House, Lyndhurst, Hampshire.

28 & 29 November. IEEM Annual conferences and AGM – River, Estuarine and Marine issues – challenges for ecologists and environmental managers.
Location: Torquay
Details and booking Forms available later from IEEM Office.