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Mid Term Review of the CAP Impacts on the environment and environmental advisors

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Introduction

There has been a continued need to reform the Common Agricultural Policy (CAP), principally fuelled by the greater demands of conformity with free trade, EC budget considerations and more recently, the financial implications of the forthcoming expansion of the EU. For many, particularly those with environmental interests, the reform programme that delivered the CAP Agenda 2000 was limited and essentially the status quo was maintained. The Mid Term Review (MTR) programme that is proposed and will be implemented is however a fundamentally radical approach. Indeed, many commentators have considered that perhaps it is too radical for a mid term reform, and would be more appropriate to introduce for the next formal reform date in 2006/7.

Those concerns notwithstanding, the reform processes of the MTR of Agenda 2000 have gathered a momentum and have, and continue to be, a dominant focus of the agricultural industry and its major representative organisations especially over the last year. It has also been at the forefront of discussion and policy development of many of the land based environmental organisations, particularly the statutory agencies including English Nature, Scottish Natural Heritage and Countryside Council for Wales. The non-statutory bodies that have both land owning and/or advisory roles have also been significantly active including for example the RSPB, Wildlife Trusts and FWAG.

Of immediate significance in the whole reform process has been the implications to decision making for individual farming businesses and the related government and advisory industries that impact upon and support them. In particular, those that are concerned with the range of environmental issues connected with agriculture are being placed in a challenging position during this period. This article therefore aims to give this sector a perspective and further understanding of the contextual background to the reforms, its impact on farming and its consequent impacts upon the environment.

There have been extensive public consultation exercises that have been undertaken by DEFRA¹. These have included:

- Second Consultation in January 2003, in response to the draft legislative

texts titled - *A Long Term Policy Perspective for Sustainable Agriculture*.

- Third Consultation in July 2003 which closes on 10 October 2003, in specific response to the amendments and discretionary elements of the January proposals.

DEFRA have also commissioned several studies over the last year to assess implications of reform measures to specific sectors of the industry, ie arable, livestock etc. In addition to these, a series of assessments of the environmental impacts of the MTR proposals have been undertaken by myself and partners at the Royal Agricultural College, upon which this article is mainly based^{2,3}.

Key themes

The final deal provisionally agreed by the EU Agriculture Council (comprising the relevant ministers from all Member States) on the 26 June provides the details and framework of the MTR reforms as we currently understand them to be. Some of the measures within these reforms are now clarified, others remain unclear. A useful summary is provided online by DEFRA⁴. The key themes within the proposals that will impact most directly upon the environment are identified and separately dealt with below. The agricultural impacts are initially outlined, upon which the impacts upon the environment are assessed. These are generalised impacts and significant variations will differ at local and regional level. The key themes are:

- Decoupling
- Cross compliance and farm advisory system
- Set-aside
- Modulation and Degression
- New Pillar II measures



Decoupling

The essential aim is that all the major agricultural support payments will be replaced by a new single payment, thus breaking the link between subsidies and production. This decoupling element of the MTR proposals is likely to have the most significant impacts on agriculture and the environment. At

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The GM debate

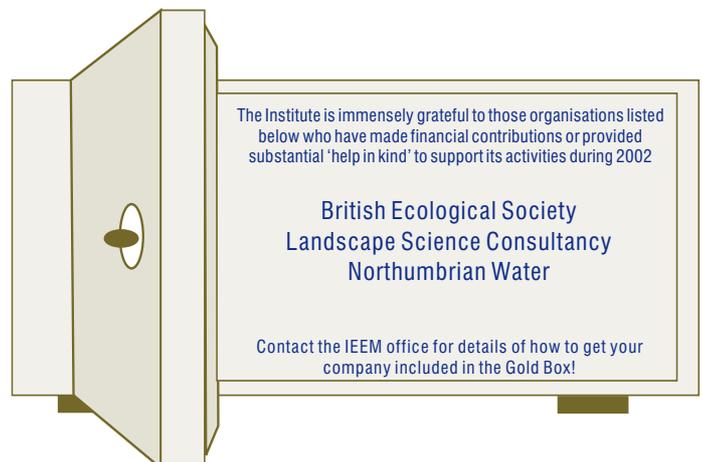
The results of the three years of field scale trials - the largest scientific experiment of its type on GM crops undertaken anywhere in the world - will be published soon in the Philosophical Transactions of the Royal Society Series B. The results will be studied by scientists, farmers, food companies and governments across the world. The study will include eight peer-reviewed papers about the effect of growing GM crops and accompanying herbicides on the plants and animals living in the fields around. The papers compare the GM fields with conventional crops grown in adjacent fields. Somehow the idea that the results will be treated by a sceptical public with a new found scientific objectivity seems far fetched. There have already been leaks. The suggestion now is that the maize trials are invalid because the processes in rearing GM Maize have been compared with the current standard techniques which make use of Atrazine. This is shortly to be banned by the European Union for suspected adverse health effects. There is another interesting aspect – the survey of attitudes of the British public towards GM crops. This produced a resounding thumbs down but seemed to be based more on a perceived danger from food rather than undue concern for biodiversity implications. And then there is the formidable opposition of Michael Meacher

Cropping and agricultural systems have always been aimed at directing energy into a growing crop at the expense of whatever else might be present. As agriculture has intensified so the balance has shifted in favour of the crop and the herbicide resistant oil seed rapes are the ultimate example. So why do we need these GM crops in the first place? – improving yields and profitability for farmers perhaps, but in the European context at least, this is just more production method supported no doubt by agricultural subsidies. In turn this produces more surpluses to be dumped on the world markets to the detriment of many parts of the third world. The growing of GM crops may also have very limited application in a third world largely dependent on subsistence farming and without the means to buy the seed or to cultivate the crop.

Europe has no real need for the crops but the Agrichemical industry supported by the United States could take European Countries to the WTO for infringing competition rules. The real issues facing agriculture and biodiversity rest much more with the reform of the CAP as outlined in the article by Will Manley, the implementation of documents such as the Durban Accord in a different article, at least as far as protected areas are concerned and the failure of Cancun.

But it would be ironic if the insurance industry became the knight in shining white armour by refusing insurance for crop contamination and any as yet unknown health effects. A survey of insurance companies involved revealed that they felt unable to insure farmers against potentially huge compensation payouts if widespread fears about GM food and farming proved to be realised. That could even make a PII premium payment less of a pill to swallow!

Jim Thompson



present payments are directly 'coupled' ie by payments of area of cereals, oil seed rape, beans and linseed or by headage payments of sheep and cattle. This system is administered through the relatively straightforward and inexpensive Integrated Administration and Control System (IACS), through which farmers claim for eligible payments.

The continuing evolution of the CAP continues to bring forward new jargon and associated abbreviations. The most significant in the MTR is the new single payment or Single Farm Payment (SFP). This is likely to be based on historic direct payment receipts and calculated on the three year average of area and headage claims made in the reference period between 2000 and 2002. The entitlement to a SFP would still require an attachment to the respective area of agricultural land, subject to compliance with minimal agricultural conditions - but not necessarily the same land upon which the SFP was based in the reference period. The respective land is defined within the EU documentation as 'any agricultural area of the holding taken up by arable land and permanent pasture except areas under fruit, vegetables, potatoes and permanent crops (eg woodland). A further by-product of the SFP, and one in which considerable concerns have been voiced by landowners including major conservation organisations, is the issue of ownership of the SFP as it is not tied to the land and can be transferred or traded. Trading of SFP will require availability of eligible land that is not currently being used to attract an entitlement, ie so-called 'naked acres'⁵. There is uncertainty of the implications for the environment, in the potential trade or transfer of SFP entitlements. It may certainly affect land values, even of marginal land which may be of particular significance for the purchase and management of land by conservation organisations.

Concurrent with the above, it must be noted that there is a derogation for Member States to implement a simple SFP based on a flat rate regional basis, ie an allocation of payment taking into account all eligible hectares. There would also be options to vary payments between grassland and arable. Although these options have some support, at this stage I believe that the SFP will be based on historic payments, certainly in Scotland and Wales which have high proportions of upland.



Herdwick Sheep, Lake District

Also, under the final agreement, Member States have various options to retain links with production, ie retain some elements of the existing 'coupled' system. Therefore in respect of the main arable and livestock sectors, these options include:

- Arable: retain up to 25% of area payments
- Livestock: retain up to 100% of suckler cow premium, and retain up to 50% of sheep headage payment (Sheep Annual Payment) in the Less Favoured Areas (LFA). The LFAs cover most of the uplands in the UK. It is likely however that full decoupling of the arable sector will happen in the UK. The main impact of decoupling of arable payments will be a focus on cereals and removal of land into fallow, an expansion of efficient farms and

wider use of alternative farming arrangements. As outlined above, eligible land that is used for the SFP cannot be used to grow fruit and vegetables.

It remains a little more uncertain regarding the UK responses to the decoupling options for the livestock sector. It is likely however that a fuller decoupling system will be implemented than in some other Member States. It is also probable that some limited headage payments may be retained to alleviate specific environmental problems associated with undergrazing and/or loss of cattle grazing. Overall, the main impacts will be a reduction in stock numbers, greater extensification and further restructuring of farm businesses.



Positive Environmental impacts

The following positive environmental impacts will be likely to follow decoupling and the introduction of the SFP.

- Overall reduction in inputs, including artificial fertilisers and pesticides, leading to improvements in water quality and biodiversity.
- An increase in fallow land, leading to a reduction in soil erosion, soil compaction and pollution of watercourses; providing habitats for farmland biodiversity; and reduction of damage to archaeological features.
- Overall the impacts on the arable sector will be generally positive for the environment, but production may intensify on some farms and in some areas, and regional specialisation may occur leading to negative impacts.
- An increase in energy crops leading to climate change reductions.
- Reductions in livestock numbers that will promote a lessening in greenhouse gas emissions, improve air quality and reduce acidification by reducing ammonia emissions, reduce soil erosion, poaching of land and pollution of water courses by nitrates, slurry and sheep dip. The reduction in grazing pressure will benefit biodiversity on important habitats and improve the condition of SSSIs, especially in the uplands.
- The UK and other Member States have an option to retain a National Envelope of 10% of the decoupled payments in the relevant sectors. This money can then be paid to targeted farmers for specific types of land management which may include for instance delivering environmental benefits. In practice, this may be not dissimilar to agri-environment, but crucially the funding is a proportion of the larger so called CAP Pillar 1 payments rather than the Pillar II payments that fund the agri-environment schemes.

Negative Environmental impacts

The following negative environmental impacts will be likely to follow decoupling and the introduction of the SFP:

- Intensification and specialisation in some sectors, especially cereals and dairying, leading to: increases in water pollution; in greenhouse gas emissions; soil erosion, compaction and contamination; and increased levels of ammonia and acidification;
- Loss and degradation of habitats with further declines in farmland biodiversity.
- Loss and degradation of landscape features such as hedgerows and

damage to archaeological features.

- Undergrazing or cessation of grazing leading to a decline in condition of SSSIs and other important wildlife sites.
- A reduction in suckler cow numbers and an increase in sheep leading to greater difficulties in achieving environmentally sensitive grazing regimes on important habitats and wildlife sites such as SSSIs.
- A decline in mixed farming and more homogeneity of cropping leading to less diversity of habitat with impacts on biodiversity and a reduction in countryside character
- Restructuring of farm businesses is also likely to continue or accelerate and labour input will decline. The reductions in labour force and an increase in contract farming will lead to a loss of countryside skills and know-how of management practices.



Winter wheat and oil seed rape

Cross compliance and farm advisory system

The existing area and headage payments have only marginal compliance links with environmental measures. The decoupled payments are to be more explicitly linked to compliance with EU standards covering animal health and welfare as well as the environment, with farmers in receipt of a SFP having to maintain land in good agricultural and environmental condition, as defined by the individual Member States. The implementation rules are unknown but critical to potential benefits. An inclusion within the final provisional agreement stipulates for example, the retention of permanent pasture subject to a derogation to give some flexibility where required. Generally however, it is unlikely that these conditions at the farm level will be particularly onerous, as a minimum is has been suggested for instance that in the UK it may require compliance with the existing Codes of Good Agricultural Practice. These would be likely to be amended into some form of agricultural and environmental code which would be measurable, not dissimilar to the existing Good Farming Practice currently demanded of all applicants to agri-environment schemes.

The UK and other Member States must set up a Farm Advisory Service that will be available to help farmers meet their cross-compliance obligations. The draft legislation in 2003 proposed an essentially compulsory system for advising all but the smallest scale farmers. This has now been amended to a voluntary system to be offered to all farmers. The environmental impact of this will be helpful, but unlikely to be significant. The FAS is likely to utilise established systems of advice and to promote an emphasis on internet based self-help solutions, which have an added attraction of being low cost.

Set-aside

Set-aside has had the opportunity and potential to deliver significant biodiversity benefits, but generally has not been fully utilised in this respect for a number of reasons. However, set-aside is to be maintained, based

upon the amount of land in compulsory set-aside in the reference period, hence normally equivalent to 10% of the arable area. The rules of set-aside will allow greater flexibility in order to promote environmental benefits. The environmental impacts include:

- Both rotational and non-rotational allowed, giving greater flexibility and retaining existing environmental benefits;
- Set-aside strips at 10m wide but can be 5m wide for environmental reasons;
- Non-food crops including energy crops can be grown as before.
- A derogation for organic farmers



Alternative crops – artichokes

Modulation

Modulation is the reduction of direct agricultural support payments and transfer of the money to Rural Development Programmes. The Rural Development Programme (or Pillar II) fund the agri-environment, woodland and rural regeneration schemes.

The final result of the proposals and amendments have resulted in farms and farmers losing much less of their SFP through lower rates of modulation. At one stage larger farms in receipt of very high payments would have been disproportionately penalised through a process of degression. This is no longer proposed and the restructuring into larger farms will not incur the penalties previously considered. The overall restructuring is likely to continue as presently. The environmental impacts of modulation are:

- The formula for mandatory modulation will ensure Member States retain 80% of contributions, therefore this will improve the funding situation for eg agri-environment schemes with associated benefit to the environment.
- The UK has secured additional arrangements for voluntary modulation which should ensure, for example, sufficient funds for the pilot Entry Level Scheme to proceed countrywide with associated benefits to the environment.

Rural Development

The Rural Development or Pillar II component of the CAP has come through various amendments that have resulted in an improved funding situation due to the modulation agreement. The environmental impacts of Rural Development include:

- Increased funding will lead to more farms that are likely to benefit from an increase in agri-environment scheme take-up. Land entered into agri-environment schemes will help to reduce impacts on soil, air and water; improve habitat management and reverse declines in farmland biodiversity; and protect and manage landscape features such as hedgerows and protect archaeological remains.
- Conversely, there is likely to be reduced incentive to enter land into agri-environment schemes (due to insufficient payment rates based on

income foregone that will be adversely affected or lack of appropriate schemes) leading to a potential loss of environmental benefits in the future. This position reflects the likely contradictory position that is evident in the differing responses at the farm level.

The implications to farm advice

Overall the impacts on the environment of the MTR are likely to be broadly favourable. Indeed it was and remains a general concern for DEFRA that they have some confidence that there are no major adverse environmental surprises as a consequence of implementing the MTR. However there remains considerable uncertainty in its final implementation, and of course there is likely to be significant variation around the average positions for individual farms and farmers.

However, to anyone involved in advisory discussions with farmers at the present time, the depth of concern about the uncertainty surrounding the implications to their businesses of the MTR is likely to be very apparent. In a recent regional farming study⁶, farmers typically described the current approach to their businesses as a "holding operation", unable and unwilling to make significant changes and sometimes referring to their situation as being "in limbo". This approach readily translates to the broader national picture and also affects actions and activities related to the environment. These would include decisions relating to, for example, agri-environment and woodland. In the same study, those directly concerned with farm conservation advice were consulted and the following comment confirmed this situation: "Currently, all the advice that is being given to farmers is don't do anything at the moment. This is good advice". Anecdotally, it is evident that there is an easy excuse not to do anything ambitious whilst uncertainty prevails. This uncertainty can be increased where there is an awareness of the review status of agri-environment schemes in the UK. In England for example, the active programme of consultation and reform will develop into a national 'broad and shallow' scheme together with a national Higher Level Scheme. DEFRA will be releasing the 'Environmental Stewardship' document relating to this Higher Level Scheme for consultation in October of this year.



Woodland near Malvern Hills

A further and practical issue relates to concurrent requirements to review payment levels for agri-environment and woodland. On the basis of income foregone these are likely to be pressured downwards. The introduction of the SFP will increase this pressure. However two points need to be borne in mind. Firstly, many of the measures within the schemes are not paid at the maximum that the legitimate income foregone calculations permit. This status will allow for payments to be maintained even where farm profitability has decreased and/or direct payments are removed from the calculation and paid via a SFP. Secondly, there is arguably no advantage in delaying going into a scheme on the issue of the level of grant payment. The levels of payment when reviewed will be implemented on existing participants as well as new applicants, unlike for instance landowners in receipt of English

Nature's Wildlife Enhancement Scheme, where payment levels are guaranteed for the period of the agreement. In a broad context therefore, now that farmers are past the crucial reference period, decisions to enter schemes should be eased.

However there is an understandable temptation to wait for the detail of the final implementation of MTR, and all advisors need to be aware that farmers will be cautious before committing themselves. It is worth re-emphasising that everyone is in a similar challenging situation, and it remains challenging for everybody across all related sectors. However, you can be confident that there are no hidden answers at this stage. Finally for those directly and indirectly connected with promoting the environment alongside farming, an understanding and confidence in a number of key points and timing of implementation should usefully be borne in mind. These are summarised below:

- The full legal text based on the precise details of the June 2003 agreement is awaiting publication. This should be available from the EC in October of this year.
- Final proposals on UK implementation are not expected until January 2004. The details of implementation must be decided by 1 August 2004.
- 2004 will be the last year of the IACS in its present form. Thereafter, submission of IACS will be different.
- Direct Payments will end 1 January 2005. The UK government has actively promoted full decoupling and will therefore be reluctant to retain any coupled payments.
- The variations in implementing various options are likely to be regionalised ie to each of the devolved countries of the UK, but not at the smaller scale of regions within England.
- The high profile breakdown in discussions at the recent WTO round in Cancun is, to 'seasoned observers', an almost normal procedure. It will not directly affect the momentum of the MTR process.

The Author would like to thank Nick Barrett for his contribution.



Not what the CAP is about!

References

- ¹ DEFRA. Consultations. Online: <http://www.defra.gov.uk/corporate/consult/default.asp>
- ² GFA-RACE. 2002. The Potential Environmental Effects of CAP Reform. Unpublished report to DEFRA.
- ³ GFA-RACE. 2003. A Long Term Policy Perspective for Sustainable Agriculture. The Potential Environmental Impacts of CAP MTR Proposals. Online: <http://statistics.defra.gov.uk/esg/reports/capmtrp/default.asp>.
- ⁴ DEFRA. Summary of the CAP Reform Agreement - 26 June 2003. Online: <http://www.defra.gov.uk/farm/capreform/agreement>
- ⁵ Jones, J. 2003. Single Farm Payment. Online: <http://www.rics.org.uk/>
- ⁶ GFA-RACE and CCRU. 2003. Cotswold Farming Study. Unpublished Report to the Cotswold AONB Partnership. **Will Manley is Principal Lecturer at the Royal Agricultural College and is Vice-President of IEEM.**

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Reedbed and fen creation on old mineral sites

Stephanie Greshon, MIEEM

In the past, the minerals industry may not have been renowned for its contribution to biodiversity, but times are changing. In fact, Hanson recently became Habitat Champion for Reedbed and Fen in England, working in conjunction with English Nature which is the lead partner for this threatened habitat. Habitat and species championing is an initiative by DEFRA to involve the private sector in aspects of the UK Government's Biodiversity Action Plan (UKBAP). As a Habitat Champion, Hanson is supporting the UK Habitat Action Plan for reedbed and fen with the intention of making a major contribution to its success. This will be achieved by providing suitable and where appropriate, areas of land that have been previously worked for minerals, allowing them to be flooded and develop into reedbed and fen. Where the opportunity exists, other land of low nature conservation interest will also be converted into the target habitats.

Reedbeds: an important and declining habitat

Reedbeds are wetlands dominated by stands of the common reed *Phragmites australis*, where the water table is at or above ground level for most of the year. They are generally associated with areas of open water. Reedbeds are a nationally scarce habitat and are among the most important habitats for birds in the UK. They also host a variety of native plants and insects. They are threatened by fragmentation, loss due to sea level rise associated with climate change, and agricultural practices, including land drainage. The target for restoration of this habitat has been agreed as part of England's commitment under the UKBAP, following the Rio Summit in 1992. This target is for the creation of 1,200 hectares of new reedbed, on land of low nature conservation interest, by 2010 (HMSO 1995).



Fen Drayton

Hanson-RSPB wetland project

This flagship project, which has received much publicity in recent months and several awards, is a partnership between Hanson and the RSPB. Britain's biggest reedbed will be created through an ambitious plan to restore sand and gravel workings at Hanson's Needingworth Quarry in the Cambridgeshire Fens. This will create the Ouse Fen nature reserve, to be managed by the RSPB, by phased restoration, over the next 30 years. The project will deliver a 700 hectare wetland complex, including 450 hectares of reedbed, capable of supporting in the order of 20 'booming' bitterns and a host of other wetland biodiversity.

Large scale gravel extraction to remove almost 30 million tons of aggregates, began at this site in 1996. The planned output is for about one million tonnes per year at one of the largest and most modern sites in the UK. At the time the original planning application was submitted, in 1993, it was expected that the bulk of the site would be restored to agricultural land, due to the then MAFF policy of restoring the best grades of agricultural land back to an agricultural afteruse. The original land classification at Needingworth was reclassified after additional surveys were carried out and, as a result, this policy presumption was removed. Following discussion with the RSPB and other conservation bodies, a vision to restore this site to a large scale mosaic of wetland habitats, was developed, resulting in a new planning application and Environmental Statement which won the Royal Town Planning Institute (RTPI) National Planning Achievement Award (2000) for Planning and Biodiversity.

The restoration will be achieved by using a modular system of reedbeds, with each module separated by clay-rich bunds. The modules are approximately 20-40 hectares, equivalent to one or two years of gravel extraction at 1 million tonnes per year. Creation of the desired landforms and subsequent reed planting will take place as each module is completed, with reed seedlings planted at a density of 2 per m² over 20% of the potential reedbed area in each module. Water levels will be managed by constructing a peripheral ditch and sluice system, enabling accurate water level control within individual modules to maintain optimum conditions for establishment of reed seedlings.

The background to the project is described in a recent RSPB handbook (White, G. J. and Gilbert, J. C (eds.) (2003).



Wicken Fen

Fens

Fens occur on soils that are at least periodically waterlogged and are often described as 'poor-fens' or 'rich-fens'. Poor fens arise where the water source originates from rocks such as granite and sandstone, resulting in habitats which tend to be more acidic, usually low in base ions and are often anaerobic. Rich fens are base rich and often alkaline habitats, associated with base rich rocks, such as limestone. Another key factor in distinguishing between types of fen is the degree of water movement and this is likely to be the major influence in most fens in mineral restorations.

Fens extend from single species swamps, usually fringing open water, to species rich plant communities dependant on groundwater discharge. There are no numerical targets for fen creation in the UKBAP, and the different types of fen are not distinguished. There may be deliberate method in this as mire and wetland ecologists will be aware that the National Vegetation Classification distinguishes between 28 types of swamp community and 38 different mire communities! Common reed (*Phragmites australis*) reedbed, or S4 in NVC terminology, is far easier to distinguish, even with its four different sub-communities (Rodwell, 1991, 1995). The fen Habitat Action Plan covers all terrestrialised wetlands, with the exception of reedbeds (which are a type of fen), grazing marshes and raised bogs, which have their own plans.

It is important, however, to have some means of distinguishing between wetland types, even at the very broad level, as otherwise it will not be possible

to assess whether restoration and habitat creation targets are being met. Reconciling the various habitat classification schemes in common use, into an integrated scheme which will be workable at the site level, is a considerable challenge. Coping with these often subtle distinctions between plant communities is a daunting task for the majority of landscape architects and environmental staff working on wetland creation on mineral sites. Hanson is working closely with English Nature's peatland advisor, Roger Meade, to try and resolve these difficulties. For the purposes of recording reedbed on Hanson sites, the criteria is to be used that it should comprise vegetation dominated by common reed with over 60% cover, where the water level remains above ground level for most of the year. The overriding aim should not be forgotten, however, which is to create and restore a mosaic of wetland communities, to offer the maximum benefit for biodiversity gain.

Fen creation poses many challenges, particularly when one considers the high diversity of both plant species within fen communities, and the diversity of the fen communities themselves. There is a lot of experience and guidance for reedbed creation but techniques for designing fens are at an early stage of development. The challenge is to get the landform, substrate and hydrology right in order to enable natural succession to play its part in the development of semi-natural fen communities. Seeking and utilising opportunities for fen creation in the design and restoration of sites, is a challenge for landscape architects working on mineral sites. When designing restoration schemes, the selection of native plants, based on sound ecological and botanical principles, will be key to the success or otherwise of a fen creation scheme, as will maintaining suitable water levels to allow both introduced and naturally colonising species to become established (Betts, 1998).



Reed bed and lagoon at Horcott

Fen creation on a smaller scale

The Hanson-RSPB wetland project is obviously biodiversity delivery on a huge scale. However, reedbeds of any size are of benefit to wildlife. Rare species such as the bittern and marsh harrier require more extensive reedbeds but habitat quality is an important factor to consider when designing and creating new reedbeds. The greatest biodiversity benefits can be achieved if the reedbed is part of a larger wetland mosaic, comprising swamp, marsh, open water and wet woodland. Large areas of edge habitat adjacent to open water will provide optimal feeding areas for birds.

The majority of reedbed and fen creation projects on Hanson sites consist of shallow water and damp, sometimes inundated surrounds, which will develop into water fringe fen and reedbed communities. Depending on depth, acidity, base richness and nutrient loading this can provide for a range of single species swamps and more diverse plant communities. At Fen Drayton in Cambridgeshire, a small redundant silt lagoon with a fringing reedbed of only 2 hectares regularly has over-wintering bittern. It is also possible to create fen communities in isolated hollows and sumps, known collectively as basin fens. The resulting plant communities will depend on the quality of the water source. Ideally, water levels should not fall below 0.5 metres.

At Horcott in Gloucestershire, reeds (*Phragmites australis*) were planted as pot grown plants (300cc root trainer plugs) at 1m x 2m centres in a series of small plots (averaging 20m X 10m) fenced with rabbit netting to deter geese and other wildfowl. Individual pot grown plants were also planted around the edge of the island protected with Netlon guards. In the autumn, additional material will be added in the form of rhizomes or turves, depending on the development of the pot grown plants. Planting was carried out in mid June 2003 and the island, which comprises basal clay topped off with a gravely subsoil, was ripped and cultivated prior to planting to relieve compaction. Maintaining an adequate water level will be the key to the success of the project and will be controlled by a newly installed weir board arrangement. On completion, this project will create 4.7 hectares of reedbed, including 1.7 hectares on an old silt lagoon.

Old silt ponds offer opportunities to create fen carr, within an overall wetland restoration scheme, as the natural succession on the clayey substrates is to wet willow dominated woodland, as they dry out or are capped off. Reedbeds will also develop naturally on old silt lagoons, if the water levels remain consistently high, but are also planted as part of specific restoration schemes, as at Horcott.

Conclusion

It is important to bear in mind, in any restoration scheme, the role of natural succession. Mineral operators can create specific habitats and have some degree of control as to how they develop during the statutory five year aftercare period, but after this, natural succession can take over. The end result may not always be that first planned and intervention management will always be necessary to maintain reedbeds and fens in favourable condition. The role of the mineral operator is to provide the Mineral Planning Authority with quarry working and design proposals and later implement construction of the approved new landform. The approved development proposals will invariably also 'set the scene' for future management of the new wetland. Consideration has to be given to the role of potential third parties in longer term management of these new landscapes. For example, at Needingworth, Hanson and the RSPB have entered into an agreement for the long term benefit of the new wetland. Here, the newly restored reedbeds will be donated to the RSPB in a phased 30 year handover deal. Under the joint agreement, the RSPB will then own and have responsibility for the long term management of the new wetland. At Lydd, in Kent, the RSPB are also taking over management of the reedbed by way of a legal freehold transfer agreement.

The result of an internal audit has shown that there are currently 47 Hanson sites throughout England where there is either existing wetland habitat or the potential exists to create it. The greatest potential for reedbed and fen restoration lies within new restoration schemes and there is obviously huge scope to offer real biodiversity gains by wetland creation on mineral sites. Developing partnerships with organisations such as local Wildlife Trusts, English Nature and the RSPB, will ensure that the existing potential for habitat creation, focused on targets contained within national, regional and local biodiversity action plans, can be fully realised.

References

- Betts, C, J. (1998). British Wild Plants in Natural Associations: A database source for landscaping, habitat creation and local planning. Christopher Betts, Worcester.
- HMSO (1995). Biodiversity: The UK Steering Group Report. Volume 2: Action Plans. HMSO, London.
- Rodwell, J.S. (1991) British Plant Communities. Volume 2: Mires and Heaths. Cambridge University Press, Cambridge.
- Rodwell, J.S. (1995). British Plant Communities. Volume 4: Aquatic communities, swamps and tall-herb fens. Cambridge University Press, Cambridge.
- White, G. J. and Gilbert, J. C (eds.) (2003). *Habitat creation handbook for the minerals industry*. The RSPB, Sandy.

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The World Parks Congress

Durban 8–17 September

Jim Thompson

World Parks Congresses occur once every 10 or 11 years and they are truly milestone events. There have now been five, the last one being at Caracas, Venezuela. The Durban Congress was the largest yet, with an estimated 3000 delegates from all corners of the globe.

South Africa was a very appropriate choice of venue - the richness and renown of some of the parks, especially the Kruger and the amazing biodiversity of some areas. For example the Fynbos - the area of scrubby vegetation near Cape Town characterised by large numbers of *Proteas* actually comprises over 3000 species of plants - roughly the equivalent of the whole of the British Flora.



Protea

The event was subtitled - '*Benefits Beyond Boundaries*' and it quickly became clear that boundaries was being used in its widest sense - physical boundaries, boundaries between nations or regions, boundaries preventing stakeholder participation, boundaries imposing false constraints on thinking etc.

The congress is a curious event – there is no mandating, the invited delegates vote as individuals and the weight and influence of the congress rests on the very formidable array of key individuals and expertise present. Congresses are meant to shape an agenda for each decade but are timed to fit in with other significant events in the global conservation calendar. For example the Caracas Conference preceded the Rio conference by a year. This time it was a reverse situation with the Johannesburg World Summit on Sustainable Development preceding the one at Durban. The Johannesburg Summit emphasised the social component of sustainability. The Durban Conference followed on with this theme in relation to protected



Nelson Mandela, Achim Steiner, Queen Noor, President Mbeki

areas which it brought together in the Durban Accord and then sent its recommendations to the Convention on Biodiversity for its meeting in Kuala Lumpur next February. It was also clearly meant to influence the Agenda for the IUCN General Assembly to be held in Bangkok in November 2004.

Nowhere was the presence of key individuals felt more than at the Opening Ceremony. This was attended by President Thabo Mbeki of South Africa and the two Patrons who were ex President Nelson Mandela and Queen Noor of Jordan. President Mbeki stressed the need to protect natural ecosystems to preserve biodiversity and ensure sustainable livelihoods and identified poverty and underdevelopment as major threats to nature conservation. Queen Noor underlined the relevance of the congress to the World Summit on Sustainable Development. She highlighted the roles of ecosystems in sustaining livelihoods and transboundary Protected areas in promoting peace and security. The atmosphere became instantly electric as Nelson Mandela, now 85 years old and somewhat frail, made his way to the microphone assisted by Achim Steiner, IUCN Secretary General. A standing ovation followed that would have been the envy of any British political leader and, as this died down, his message - delivered in a voice of immense strength called on the congress to recognise certain key messages – that protected areas cannot be managed in isolation, that they support significant populations whose livelihood may depend on those very areas and that protected areas had a role to play in global poverty alleviation. He also remarked on the relative maturity of most of the audience and called for there to be a greater say of young people in protected areas management.

You have to marvel at how the whole process is managed. – 2 days of plenary sessions and symposia, 3 days of workshops split into 7 parallel streams, sometimes subdivided again, 3 cross cutting themes, special events, entertainment, book launches, photocalls, press conferences. All of these followed by the final 2 days of approving resolutions and bringing it all together. As I remarked following the IUCN general assembly in Amman, you need several years practice or you have to be a natural IUCN junky not to feel utterly drained by the end of it and, just occasionally, lost .

Amongst the gathered 3000, there were representatives from the World Bank, from governments, numerous NGO's – WWF, Birdlife International, the Nature Conservancy, Agencies including English Nature, SNH and CCW and national and regional parks too numerous to mention. It was interesting to see the very large contingent from the U.S., a timely reminder that despite little evidence of the current President having much sympathy for ecology, there is a great deal of work, both voluntary and otherwise, still going on. The Director of the US National Parks Service obviously felt she had a full agenda and remarked that any park director these days requires to be an effective operator of the stakeholder network to be appointed. This is a far cry from the quasi wilderness concept which characterised the early national parks such as Yellowstone. The link with other worldwide events was never far from the surface with some delegates having travelled in dispirited form from the failed WTO talks in Cancun, a 30 hour journey. There were several expressions of the sentiment that nowadays you probably ought not to be an ecologist to be a Park Director - with stakeholders, local communities you need to be the ubiquitous general manager - but are all ecologists incapable of relating to the real world around them? - a visit to an IEEM conference might dispel a few prejudices.

This change in emphasis to encompass local communities was billed as the new paradigm. This is clearly the new buzzword. According to the Oxford Dictionary it means in this context, a world view underlying the theories and methodologies of a scientific subject. There were questions raised as to how the new paradigm applied in the European context. Here the majority of National Parks and all UK National Parks are Category V – Protected landscapes – and there is often a long history of dialogue with the local communities, albeit not always harmonious. Riots famously ensued when the Category V National Park in the Cevennes in France was created. So if

this leads to an improved dialogue with local communities, it has to be a plus. Within the South African context in particular, and where under the Apartheid regime, very few blacks ever went or were allowed into the national parks except as workers, these sentiments have a powerful ring. Compared to Africa though, the average inhabitant of a national park in the UK already has significant rights and interests and the challenge for park managers is how to strike the appropriate balance between conserving the resource and pressures for economic development. And there is always that certain to make enemies factor – planning regulations and guidelines. In a slightly different context, the other factor to consider is scale. With large animals size definitely matters. The Kruger National Park is currently rather larger than Wales and the whole area is fenced! By agreement with South Africa, Zimbabwe and Mozambique there is now to be a significant enlargement to form the Great Limpopo Trans-boundary Park.

The workshops were hives of industry, sometimes going on quite late and each charged with working on the draft resolutions from the congress prepared beforehand in draft by Roger Crofts and others. I personally spent a couple of hours with others on the declaration on urban ecology only to find the resolution, although approved, somehow transformed into something I hardly recognised. IUCN has an army of people skilled in drafting and this is where they come into their own - almost like a composite resolution at a Party Conference in the UK.

Well does such a gathering do much good? – Delegates generally seemed to think so. Time will tell but with the feeling that the results of Caracas had exceeded expectations there was every reason to suppose that Durban would do the same. Since the Caracas congress which had resolved to establish protected areas over 10% of the earth's surface, a figure of nearly 12% on land has actually been achieved but only 1% in water. Water then remains a great concern. It might be a bit simplistic to put this progress down entirely to the Caracas conference but it clearly had an influence. And this is really where the new paradigm comes in - it is all very well for new protected areas to be declared but they have to be more than lines on a map. They need to be planned and managed and they need resources and above all, they need the commitment of the local communities.

If it all sounds a bit too harmonious, the session on extractive industries and protected areas was more lively. IUCN has a way of dealing with dissenters and this came to the fore in the session – a very simple process indeed – cut off the microphone when a troublesome speaker from the floor starts to rock the boat! All the same it is a welcome move that many companies have pledged not to explore or mine in World Heritage Sites and the Shell commitment to upgrade their operational practices wherever they operate in categories I – IV is to be welcomed - but what about V and VI?

As background to the sessions there was a very comprehensive exhibition, all sorts of cultural events and the backdrop of the City of Durban, a city famed for its Indian population and its curries! Durban, though, has its

drawbacks. Most of the hotels were separated from the conference centre by an area which in all honesty, was not Durban at its best and it was not long before the first spate of muggings of conference delegates featured in the local press!

On a personal front I was able to establish several useful contacts or leads – the Institute of Ecology and Environmental Science in Australia but the counterpart in South Africa with which we exchange publications could not be located. Networking was hampered by the lack of any list of delegates – apparently this was on the website but to access the website you have to have some fancy gear or part with a cool 100 rands (£8.70) to use the Internet in the Internet Café. In addition to this I re-established contact with several contacts from Europarc, going back to the time when I was Chairman of the then UK section and Michael Starrett who will be one of the speakers at the forthcoming conference in Buxton.

The UK contingent was certainly evident although again some co-ordination might have been useful. There were 5 IEEM members present (apologies if I have missed anyone but this is where the delegate list would have been handy). These were myself, David Jamieson from BTCV Scotland and Council Member, Paul Goriup and Sarah Fowler from the Nature Conservation Bureau, Roger Mitchell from English Nature and finally Peter Bridgewater, now at the Ramsar Convention who played a particularly active role in the sessions on linkages in the landscape/seascape. So the IEEM presence was certainly there.

10 days of conferencing are not for the faint hearted and there was a welcome 2 day break in the middle when most delegates went on tours arranged to fit in with the theme of the conference and the IUCN staff worked on their resolutions. My visit to the Hluhluwe-Imfolozi Park in Zululand was truly magic - a white rhino appeared only a mile into the park! Incidentally you can buy a Black Rhino there for £45,000 - the only thing is you have to buy 6 and provide evidence of a suitable place to keep them - any takers?

But what did the Conference achieve?

There were four key documents – Firstly the substantial list of resolutions and, stemming from these, the Durban Action Plan, the Durban Accord and the Message to the Convention of Biodiversity for its meeting next year in Kuala Lumpur. They can easily be dismissed as aspirations with a limited prospect of being achieved but the fact that much had moved on since Caracas and Rio does underline their value and is something of an inspiration.

The key documents are also on the WPC website and can be consulted there. The resolutions are particularly lengthy and run into 50 pages with 32 separate points.

To give a flavour of what was achieved, I have listed the headings for the resolutions and included the text of the Durban Action Plan, the introduction to Durban Accord and the very important message to the Convention on Biodiversity.



Sarah Fowler, Peter Bridgewater, Paul Goriup, Jim Thompson, David Jamieson and Roger Mitchell

RESOLUTIONS FROM THE DURBAN CONFERENCE:

- 01 Strengthening Institutional and Societal Capacities for Protected Area Management in the 21st Century
- 02 Strengthening Individual and Group Capacities for Protected Area Management in the 21st Century
- 03 Protected Areas Learning Network
- 04 Building Comprehensive and Effective Protected Area Systems
- 05 Climate Change and Protected Areas
- 06 Strengthening Mountain Protected Areas as a Key Contribution to Sustainable Mountain Development
- 07 Financial Security for Protected Areas
- 08 Private Sector Funding of Protected Areas
- 09 Integrated Landscape Management to Support Protected Areas
- 10 Policy Linkages between Relevant International Conventions and Programmes in Integrating Protected Areas in the Wider Landscape/ Seascape
- 11 A Global Network to Support the Development of Transboundary Conservation Initiatives
- 12 Tourism as a Vehicle for Conservation and Support of Protected Areas
- 13 Cultural and Spiritual Values of Protected Areas
- 14 Cities and Protected Areas
- 15 Peace, Conflict and Protected Areas
- 16 Good Governance of Protected Areas
- 17 Recognising and Supporting a Diversity of Governance Types for Protected Areas
- 18 Management Effectiveness Evaluation to Support Protected Area Management
- 19 IUCN Protected Area Management Categories
- 20 Preventing and Mitigating Human-Wildlife Conflicts
- 21 The World Heritage Convention
- 22 Building a Global System of Marine and Coastal Protected Area Networks
- 23 Protecting Marine Biodiversity and Ecosystem Processes through Marine Protected Areas beyond National Jurisdiction
- 24 Indigenous Peoples and Protected Areas
- 25 Co-management of Protected Areas
- 26 Community Conserved Areas
- 27 Mobile Indigenous Peoples and Conservation
- 28 Protected Areas: Mining and Energy
- 29 Poverty and Protected Areas
- 30 Africa's Protected Areas
- 31 Protected Areas, Freshwater and Integrated River Basin Management Frameworks
- 32 Strategic Agenda for Communication, Education and Public Awareness for Protected Areas



THE DURBAN ACTION PLAN

Outcome 1: Protected areas' critical role in global biodiversity conservation fulfilled.

Key Target 1: specific action by the Convention on Biological Diversity to improve the role of protected areas in biodiversity conservation.

Key target 2: specific action by all signatories to the World Heritage Convention to improve the role of World Heritage sites in biodiversity conservation.

Outcome 2: Protected areas' fundamental role in sustainable development implemented.

Key Target 3: action taken to ensure that protected areas strive to alleviate poverty and in no case to exacerbate poverty.

Outcome 3: A global system of protected areas linked to the surrounding landscapes and seascapes achieved.

Key Target 4: system of protected areas representing all of the world's ecosystems completed by 2010.

Key Target 5: all protected areas linked into wider ecological/environmental systems on land and at sea by 2015

Outcome 4: Improved quality, effectiveness and reporting of protected area management in place.

Key Target 6: all protected areas to have effective management in existence by 2015.

Key Target 7: all protected areas to have effective capacity to manage.

Outcome 5: The Rights of Indigenous Peoples, Mobile peoples and Local Communities Recognized and Guaranteed in Relation to Natural Resources and Biodiversity Conservation.

Key Target 8: all existing and future protected areas shall be managed and established in full compliance with the rights of indigenous peoples, mobile peoples and local communities.

Key Target 9: protected areas shall have representatives chosen by indigenous peoples and local communities in their management proportionate to their rights and interests.

Key Target 10: participatory mechanisms for the restitution of indigenous peoples' traditional lands and territories that were incorporated in protected areas without their free and informed consent established and implemented by 2010.

Outcome 6: Empowerment of Younger Generations Achieved.

Key Target 11: ensure the greater participation of younger generations in the governance and management of protected areas and take action to strengthen their capacity to contribute to and expand the conservation community as a whole.

Outcome 7: Significantly greater support for protected areas from other constituencies achieved.

Key Target 12: support achieved from all major stakeholder constituencies.

Outcome 8: Improved forms of governance, recognising both traditional forms and innovative approaches of great potential value for conservation, implemented.

Key Target 13: effective systems of governance to be implemented by all countries

Outcome 9: Greatly increased resources for protected areas, commensurate with their values and needs, secured.

Key Target 14: secure sufficient resources to identify, establish and meet the recurrent operating costs of a globally representative system of protected areas by 2010.

Outcome 10: Improved communication and education on the role and benefits of protected areas



THE DURBAN ACCORD

Our Global Commitment for People and Earth's Protected Areas

We, the 3,000 participants of the Vth World Parks Congress, celebrate, voice concern and call for urgent action on protected areas. We bear witness to those places most inspirational and spiritual, most critical to the survival of species and ecosystems, most crucial in safeguarding food, air and water, most essential in stabilizing climate, most unique in cultural and natural heritage and therefore most deserving of humankind's special care. We urge action for the benefit of protected areas so that their benefits may be conserved and equitably shared.

Who We Are

We are a gathering of resource managers, scientists, civil servants, and industry leaders. We include leaders of non-governmental organizations—both large and small, of international bodies and grassroots groups. We include indigenous and mobile peoples and local communities. We are men and women of younger and older generations, hailing from major urban centers and small communities across 154 countries. We share experience from the Earth's wildest frontiers and its most degraded lands. We carry the voices of countless concerned people from every corner of the world.

The Rapidly Changing World

All around us we see profound transformations: climate change, fragmentation of landscapes and seascapes and the spread of invasive alien species. We see growing populations, globalization, urbanization, decentralization, and rising demands for food, fibre, fuel and water. We see loss of biological and cultural diversity and failing ecosystems that serve as vital organs of the Earth. We see 3,000,000,000 people in poverty, gripped by daily struggles for survival. We see the changing faces of global and community leaders, too often too burdened by societal demands to nurture Earth's life support systems.

A New Paradigm for Protected Areas

In this changing world, we need a fresh and innovative approach to protected areas and their role in broader conservation and development agendas. This approach demands the maintenance and enhancement of our core conservation goals, equitably integrating them with the interests of all affected people. In this way the synergy between conservation, the maintenance of life support systems and sustainable development is forged. We see protected areas as vital means to achieve this synergy efficiently and cost-effectively. We see Protected areas as providers of benefits beyond boundaries—beyond their boundaries on a map, beyond the boundaries of nation-states, across societies, genders and generations.



MESSAGE OF THE VTH IUCN WORLD PARKS CONGRESS TO THE CONVENTION ON BIOLOGICAL DIVERSITY

The Vth IUCN World Parks Congress met on 8-17 September in Durban, South Africa, bringing together some 3000 delegates, representing a diverse range of countries, interests and experience in protected areas. The Congress identified the following actions as being relevant for the development of a programme of work under the Convention, drawing from its discussions and main outcomes, and especially from the Durban Accord and Action Plan.

Biodiversity and ecosystem services are essential to sustainable development

Biodiversity plays a critical role in overall sustainable development and poverty eradication. It is essential to our planet, human well-being and to the livelihood and cultural integrity of people. Biodiversity is currently being lost at unprecedented rates due to human activities. This trend will only be reversed if the benefits and costs of maintaining biological diversity are distributed equitably.

The Convention on Biological Diversity is an indispensable element to ensure the continued provision of ecosystem services

The WSSD has recognized the Convention as the key instrument of global cooperation for the conservation and sustainable use of biological diversity and the fair and equitable sharing of benefits arising from use of genetic resources.

A representative and effectively managed protected areas system is crucial to achieve the objectives of the Convention and the 2010 target

A more efficient and coherent implementation of the three objectives of the Convention and the achievement by 2010 of a significant reduction in the current rate of loss of biological diversity will require a comprehensive, representative and effectively managed system of protected areas. However, a new paradigm is needed to enable protected areas to better fulfill their role in implementing the Convention, fully recognizing the benefits that protected areas provide beyond boundaries.

The Congress acknowledges progress in the development of protected areas globally, but has also identified serious gaps, challenges and deficiencies

The Congress celebrates the expansion of protected areas to cover 11.5 percent of the Earth's land surface, but notes that there remain serious gaps in coverage of many important species and biomes. Management of many existing protected areas remains ineffective.

Protected areas are challenged by underlying and accelerating forces and threats, such as poverty, globalization, security and global change. Protected areas are threatened by habitat loss, fragmentation, unsustainable exploitation, invasive species, lack of capacity, inappropriate policies and incentives, and inequitable distribution of costs and benefits. The Congress calls on the Conference of the Parties to consider the following actions:

1. Planning, selecting, establishing and managing protected areas systems.

The existing system of protected areas is incomplete and requires strengthening, expansion and consolidation if the Convention's 2010 target – as well as many elements of the Millennium Development Goals (MDGs) – is to be met. The global system of protected areas needs to safeguard all globally and nationally important areas for biodiversity, based on sound science. The system needs to comprise an ecologically representative and coherent network of land and sea areas that should include protected areas, corridors and buffer zones, and is characterized by interconnectivity with the landscape and existing socio-economic structures and institutions. To this end, the Congress calls upon the Conference of the Parties to adopt specific targets and timetables for:

- **Species:** Effectively conserve all globally threatened species *in situ* with

an immediate emphasis on all globally critically endangered and endangered species confined to a single site.

- **Habitats:** Effectively conserve viable representations of every terrestrial, freshwater and marine ecosystem within protected areas.
- **Ecological processes and services:** Protect all natural ecological processes that generate and maintain biodiversity and provide humanity with vital ecosystem services.

The Congress further calls on Parties to:

- Maximize representation and persistence of biodiversity in comprehensive protected area networks focusing especially on threatened and under-protected ecosystems and species globally threatened with extinction;
- Take action to address the severe under-representation of freshwater ecosystems, and marine ecosystems in the global protected area system in accordance with the WSSD 2012 target;
- By 2012, devote urgent attention to creating and expanding marine protected area networks, including the marine biodiversity and ecosystem processes in the world oceans that lie beyond national jurisdiction, including Antarctica;
- In accordance with the principles embodied in the Ecosystem Approach, ensure that protected area systems are linked to, supported by, and integrated with efforts to conserve and sustainably use biological diversity across the broader landscape/seascape;
- As called for in the WSSD Plan of Implementation, take actions to promote the development of national and regional ecological networks, corridors and transboundary protected areas;
- Apply the Ecosystem Approach to the planning and management of all protected areas and other important areas for biodiversity by 2010;
- Elaborate and implement national strategic plans for systems of protected areas in the context of National Biodiversity Strategies and Action Plans (NBSAPs) and management plans for individual areas; and
- Address global change adaptation measures in protected area management strategies.

2. Benefits, Equity and Participation

The Congress emphasised the role that protected areas play in sustainable development, ecological services, livelihood opportunities, and poverty eradication. The Congress also noted that protected areas may have a negative impact on indigenous peoples, including mobile indigenous peoples, and local communities, when their rights and interests are not accounted for and addressed and where they do not fully participate in and agree to decisions that affect them. It further noted the importance of securing indigenous peoples' rights to their lands and territories as an imperative to guarantee sustainable protected areas.

To those ends, the Congress calls on the Conference of the Parties by 2010 to:

- Ensure that indigenous and mobile peoples, local communities, women and youth, fully participate in the establishment and management of protected areas and that mechanisms are put in place to guarantee that they share in the benefits arising from these areas;
- Foster and implement effective communication programmes to ensure that indigenous and mobile peoples and local communities effectively participate in the establishment and management of protected areas;
- Reform protected area policies, systems and funding arrangements to effectively support community conserved areas and co-managed protected areas;
- Ensure that NBSAPs and protected areas policies address poverty issues, and that national poverty reduction strategies include recommendations and actions of NBSAPs; and
- Support and contribute to the implementation of all MDGs, especially those related to social, economic and cultural rights as fundamental performance criteria for all protected area policies, systems and site level processes.

3. Enabling Activities

A well-managed global system of protected areas requires urgent action to create enabling conditions and empower the broad range of sectors,

communities and interests who must be involved. A fundamental enabling condition is the establishment of trust and the development of dialogue among all stakeholders. To these ends, the Congress calls on the Conference of the Parties to take action in the following areas:

3.1 Capacity building

Protected areas need to be managed by effective institutions, within a supportive policy and legal framework, and by trained professionals with the necessary technical and management skills. Inadequate capacities in these areas severely limit the contribution that protected areas can make to the aims of the Convention and achievement of its 2010 target. Capacity building in this broad sense needs to be a central priority of the programme of work. To this end the Congress calls upon the Conference of the Parties to:

- Implement a strong, comprehensive and sustainable programme on capacity building by 2006;
- Create an implementation support mechanism for protected area systems that uses existing structures, including the CBD Clearing-House Mechanism, inter-governmental organizations (IGOs) and non-governmental organizations (NGOs); and
- Use, as appropriate, the guidelines and tools developed by the World Commission on Protected Areas, such as the Protected Areas Learning Network (PALNet).

3.2 Financial Support

As much as \$25 billion in additional annual support is required to establish and maintain an effective global system of protected areas. Governments, especially from developed countries, IGOs, NGOs and the private sector need to provide additional financial resources.

Specific actions that would encourage the provision of more effective financial support include:

- Reconfirm that a more efficient and coherent implementation of the Convention and the achievement by 2010 of a significant reduction in the current rate of loss of biological diversity will require the provision of new and additional financial and technical resources to developing countries, as stated in the Plan of Implementation of WSSD;
- Request the GEF (United Nations Environment Programme Global Environment Facility) to advise COP 8 on the current global annual protected areas funding levels and identify options for how funding shortfalls, particularly recurrent funding, could be filled;
- Request the GEF to maintain current levels of support for protected areas and commit, in the fourth replenishment, to a substantive increase in funding for protected areas and biodiversity, to help meet any identified funding shortfall;
- Call upon donors to commit to substantive increases in funding for protected areas and conservation, and mobilize additional funding by 2006; and
- Encourage Parties to undertake by 2006 national-level studies of the socio-economic values of protected areas, and establish country-level Sustainable Financing Plans that support national systems of protected areas. Particular attention should be paid to develop mechanisms that promote closer collaboration with responsible private sector companies and local communities, especially the generation of substantially higher level of financial resources related to such industries as tourism and financial services.

3.3 Governance and Policy

Sound policies and well-functioning institutions are essential for effective management of protected areas. Key actions to promote appropriate protected area governance and policies include the following:

- Recognise the diversity of protected area governance approaches, such as community conserved areas, indigenous conservation areas and private protected areas, and encourage Parties to support this diversity;
- Promote mechanisms for equitably distributing the costs and benefits of protected areas;
- Empower local and indigenous communities living in and around protected areas to effectively participate in their management;

- Consider governance principles such as the rule of law, participatory decision-making, mechanisms for accountability and equitable dispute resolution institutions and procedures;
- Identify and implement policy reforms to provide a supportive enabling environment for more effective management of protected area systems and sustainable use of biological resources in their surrounding landscapes and seascapes;
- Harmonize sectoral policies and laws to ensure that they support the conservation and effective management of protected areas; and
- Promote synergies between the CBD and other agreements and processes such as the World Heritage Convention, the Convention on International Trade in Endangered Species of Fauna and Flora, the Ramsar Convention on Wetlands of International Importance and the Convention on Migratory Species and well as relevant regional initiatives.

4. Assessment, Monitoring and Reporting

In order to measure progress toward the 2010 target, effective assessment, monitoring and reporting mechanisms need to be developed. To these ends, the Congress calls on the Conference of the Parties to take action in the following areas:

- Consider the IUCN protected areas category system to be a common language that facilitates assessment of, and reporting on, protected area management, including on the MDG on Environmental Sustainability, and as a basis on which standards and indicators can be developed;
- Require information on management effectiveness to be included in the national reporting process by 2008 and request the Secretariat to distribute this information;
- Adopt assessment systems for management effectiveness in 10 percent of protected areas by 2010; and,

- Encourage Parties to provide complete, precise and timely reports of their protected areas information on an annual basis through the World Database on Protected Areas (WDPA) mechanism.

The Congress therefore calls on the Conference of the Parties to:

- Adopt a rigorous programme of work on protected areas including specific targets and timetables that responds to the needs identified at this Congress, as a contribution to meeting the 2010 target;
- Establish effective means of monitoring and assessing the implementation of the programme of work;
- Reaffirm their strong political commitment to the implementation of the programme of work; and
- In the event that assessment indicates that the programme of work is not adequate, to consider adoption of stricter measures, to ensure that protected areas can contribute most effectively to meeting the 2010 target.

Final Thoughts for IEEM

IEEM as a body is clearly a minor player in a meeting such as this but individual members in their various capacities can certainly make a difference. One point to strike me was that with this new emphasis on community involvement, with substantial numbers of new protected areas demanding effective management there is going to have to be a massive capacity building exercise globally. This new workforce is going to need training and is going to need professional standards by which it can operate. There seem to be very few organisations around the globe similar to IEEM and the IEEM model could be a very useful template for similar developments in other countries.

After that dose of mental indigestion it was time for me to take a post conference tour - to the Kruger National Park - you need an experience like that just to remind yourself of the value of such a conference!

Jim Thompson is Executive Director of IEEM.

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Mitigating Impacts on White-clawed Crayfish (or the real story of what happens on construction sites)

Stephanie Peay, MIEEM

Why white-clawed crayfish need help

There is a widespread but declining population of white-clawed crayfish *Austropotamobius pallipes* in England and Wales (Sibley et al, 2002). The loss of white-clawed crayfish is due to crayfish plague *Aphanomyces astaci*, competition from non-indigenous crayfish, and loss of habitat or reduction of quality. Most river catchments which have white-clawed crayfish now also have wild-living populations of signal crayfish, which consistently out-compete the native species, even if the non-indigenous crayfish are not carrying, or at least not expressing, the lethal crayfish plague.



Berried female White-clawed crayfish

The species is listed in the EU Habitats and Species Directive (1992) in Annex II, which requires member states to designate Special Areas for Conservation for the named species, and in Annex V, which requires states to maintain the species in favourable conservation status. In the UK it is also protected under the Wildlife & Countryside Act 1981 (as amended), protected from 1998 from “taking or sale” under Schedule 5 of the Act.

Ideally, all existing populations of white-clawed crayfish should be left undisturbed where they occur. Sometimes, however, works have to be carried out in waterbodies and these may cause temporary or permanent loss of habitat and loss of crayfish.

For works affecting SSSIs there is a clear requirement for notification of proposed works and a requirement to avoid impact, provide mitigation and/compensation. Outside designated sites the degree of protection for crayfish is less clear. A licence is required from English Nature or Countryside Council for Wales for surveys to be undertaken. A project-by-project licence is required to take animals for the purposes of conservation, e.g. for rescue and relocation during construction work. Crayfish, however, do not have the same high level of protection from authorised works as do bats, badgers or great crested newts and it is generally the Environment Agency (EA), or

ecologists promoting best environmental practice which are the drivers for mitigation measures outside SSSIs.

Works involving construction usually require planning permission and may be subject to environmental impact assessment (EIA). In addition, the EA has byelaws that require anyone proposing to carry out construction works within a specified distance from a main river to obtain their approval, whether or not planning permission is required from the local authority. The EA imposes conditions on works to safeguard species and habitats. It also has internal procedures for EIA of its own flood defence works. There are also small watercourses that are not designated as main river, but may have crayfish. Dredging, bank works and management of vegetation is often undertaken by local landowners and may not be subject to any control. Both locally and cumulatively, however, small-scale management of rivers can have significant impacts on crayfish and other species.

Usually it is contractors, who carry out construction work in waterbodies. Environmental mitigation measures may form part of the project design, and will usually require approval from the statutory agency. The client for the project may commission environmental work directly, i.e. separately from the contract for construction; or it may be the responsibility of the contractor to obtain a specialist consultant. The contractual arrangement can affect the degree of “clout” a consultant has on site. Many contractors are increasingly environmentally aware and take pride in achieving good on-site mitigation; but some others still have a way to go. For mitigation proposals to be successful there has to be good communication between the ecologist and the various people involved, from client and designers down to staff working on site.

Works that can adversely affect crayfish

Works may lead to direct loss of refuges used by crayfish in the channel and in the banks, or may cause the death of crayfish. There may be indirect impacts, for example through the release of silt and other materials into the water. Construction projects often necessitate de-watering of the channel, or lowering of the water level in still waters. Dry working reduces the risk of siltation and pollution incidents, but draining the bed exposes crayfish to air. White-clawed crayfish are damaged by exposure longer than 48 hours, even in humid conditions (Taylor & Wheatly, 1981) and in less time if it is hot and dry. By contrast, signal crayfish *Pacifastacus leniusculus* can survive for three months out of water. De-watering also leads to increased risk of predation from birds and mammals.

Sometimes construction works can be beneficial, especially where past modifications have left waterbodies partly or wholly unsuitable for crayfish. Table 1 shows potential impacts on crayfish.

Case studies

The following case studies give examples of some relatively small construction projects that have affected rivers or canals with white-clawed crayfish and where I have had at least some involvement. As this is a review of problems as well as successes I have omitted details of the companies involved.

Case Study 1 – Construction work in an urban stream

In Yorkshire in 1998, there was a project to construct a major new sewer main, which would reduce discharges of combined sewer overflows (CSO) to a stream in a wooded valley in an urban park. The works involved a new pipeline crossing the stream in an open-cut trench, plus the construction of a new outfall about 100m downstream. For both components of the works

Operation	Table 1 Potential Impact of Works in Rivers				Comments on Impacts
	Potential Impacts	De-water	Disturb banks	Indirect impacts	
Construct/ repair bridge	Yes	Yes	Yes	Possible siltation/ pollution	Damaged masonry may be used by crayfish. Concrete bridge piles have no refuges. Scale of impact depends on design and scale of work. Possible siltation or pollution during construction.
Construct outfall	Possibly	Yes	Yes	Siltation/ pollution	Usually localised impact. May require reinforcement of channel bed at outfall. Discharge may reduce water quality locally.
Construct pipeline crossing	Yes	Yes	Yes	Possible siltation/ pollution	Cut and cover in de-watered channel is usually cheapest for small rivers. De-watering localised and short duration. May be permanent loss of habitat.
Repair canal washwall or dam	Yes	Yes	Yes	Possible siltation/ pollution	Loss of refuges. De-watering may be extensive or prolonged.
Divert channel	Yes	Yes	Yes	Possible siltation	Total loss of channel. New one may not have habitat for crayfish. Some siltation when carry out diversion.
Drainage from construction sites	No	No	No	Siltation/ possible pollution	May increase silt downstream and risk of pollution.
Reinforce bank	Possibly	Possibly	Yes	Possible siltation	Permanent loss of refuges with sheet-piling, concrete or mortared brickwork. May create new refuges with unmortared stone or woody material.
Regrade bank	Possibly	No	Yes	Siltation	Loss of bank complexity and associated refuges. May be extensive if for flood defence.
Dredging	Yes	Possibly	Possibly	Siltation	Loss of crayfish among aquatic plants and in burrows. Discharge of silt during works. Often very extensive.
Remove trees on banks	No	No	Possibly		Temporary loss of shade and leaf litter if coppice. May be permanent loss of refuges among roots if trees are grubbed out.
Remove debris dams	No	No	Yes	Possibly loss of food	Routine maintenance for flood defence - loss of refuges and litter as food source.
Remove stock fencing, or increase stock in unfenced pasture	Possibly	No	Yes	Siltation/ pollution	Access of stock tramples banks and sometime bed. Loss of refuges in banks, reduction/loss of emergent and submerged plants. Direct pollution from livestock. Increased erosion and siltation.

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it was necessary to de-water part of the stream, although the aim was to limit the dewatered area to about 10m or so.

Previous surveys had shown the stream to have an abundant population of white-clawed crayfish. The mitigation measures carried out immediately prior to excavation in the channel involved manual clearance of all stone that could potentially provide a refuge for crayfish. The cobbles and boulders were stored for use in re-instatement. The stream was blocked with sandbags either side of the working area and the flow directed down a 600mm diameter pipe, de-watering the bed of the channel. All crayfish found were removed and relocated in suitable habitat elsewhere in the same stream.

The design for the CSO included hard surfacing of the streambed to reduce scouring on occasions when the CSO discharged, extending up the opposite bank. Following discussion with the site agent, the existing stone and trees on the bank were retained and only the bed was to be surfaced with large, unmortared stones. Unmortared stone-revetting (essentially a drystone wall) was added along the bank on either side of the CSO.

The works on the CSO outfall went largely to plan, during dry conditions in summer. As frequently happens on such projects there were various delays, e.g. in getting pumps of sufficient capacity on site, plus enough sandbags for the de-watering exercise. As the stream was clear and shallow, most of the stone was cleared from the bed prior to dewatering and crayfish were removed at the same time.

Silt-blankets were used downstream of the working area to reduce siltation during disturbance of the bed. De-watering was carried out the day after clearance of the bed, after a further check of the bed for crayfish (none found). When de-watering commenced, crayfish started emerging from refuges in the banks, with most appearing in the first 30 minutes and a reducing numbers up to 2 hours after exposure. Supervised excavation of the bank started when no crayfish had emerged for at least 30 minutes.

At the site for the CSO outfall, the bank was excavated to create the opening for the outfall and isolated from the stream using sandbags. The streambed was paved on the same day as dewatering occurred. Salvaged cobble was then put back on the unpaved areas and along the margins.

The crossing of stream by the sewer pipeline was delayed until November, because a period of wet weather slowed the rate of work on the pipeline construction. This time the flow was too high for prior clearance of the channel. This time the construction staff installed the flume pipe and had started the de-watering before the crayfish team was informed and came on to the site, which was not according to the plan.

A section some 5m wide and 7m long (35 m²) was dewatered. The recorded average density was 2.6 crayfish m⁻². They were found mainly in an undercut section of wall and under a cracked area of re-inforced concrete, which was prised out with an excavator so it could be searched manually, areas selected by crayfish because they were especially resistant to high flows, which are dangerous for crayfish. Juveniles of less than 25mm carapace length (CL) represented only 19% of the total catch. This is a low catch of the true population of 2+, 1+ and 0+ animals. This is not surprising, because conditions soon degenerate to mud as the dewatering proceeds and small crayfish may be missed during the rescue.

As with the outfall, stone taken from the bed was stored for use in the reinstatement. The crayfish removal and the cut and cover pipeline were done within one day. The construction of new stone-revetted banks and reinstatement of the bed were carried out subsequently – but not under the supervision of a crayfish surveyor, as the contractor wanted to minimise costs. The pipeline and its concrete capping were too shallow for the crossing



Meanwood Beck

to be reinstated as a glide, with cobble and boulder over sand and gravel. The contractor simply covered the concrete pipeline with a layer of clay and bulldozed the salvaged cobble into the general fill material on the construction site. There was no opportunity for the ecologist to inspect the reinstated channel while the contractor was on site and there was no provision for any monitoring of crayfish after the works.

At the CSO outfall, the new stone-revetted banks are only covered by water during high flows and do not normally offer any refuges for white-clawed crayfish. The interstices between the stone slabs paving the bed were left unmortared, but soon filled by sand and gravel. The area remains as a shallow run, with a few crevices for occasional use by crayfish, although this is not very different from the original riffle in terms of limited habitat for crayfish.

The channel and banks after the pipeline crossing were left with no habitat suitable for crayfish. Four years later, winter floods scoured off the clay, causing some siltation in crayfish habitat downstream, although no worse than other localised scouring of banks that occurs in this stream during floods. The concrete cap was exposed and a scour hole developed immediately downstream. Ironically, if this starts to damage the concrete casing of the pipeline, relatively stable refuges may become available again. An abundant population of white-clawed crayfish is still present in the stream and the impacts of construction were localised.

Case study 2 – a rural pipeline crossing

In North Yorkshire a stony stream with crayfish was to be crossed by a pipeline. No crayfish were found during the localised prior clearance of the bed. The stream was a moderately steep riffle at this point and so was relatively unsuitable habitat. The crossing of the stream was delayed by several days, due to problems elsewhere on the pipeline route. There are always unplanned events in construction programmes, most commonly due to machines breaking down, supplies being delayed, or bad weather. Delays cost money, but having people waiting, including ecologists, is usually a lot less expensive than having machines standing idle.

A few crayfish were found on the streambed after the clearance but before the excavation started, following a flood event in which they may have been washed downstream or sought refuge in the disturbed bed. The contractor omitted to tell the crayfish consultant when work was due to start and had not previously mentioned that the works involved excavation of a section of



Eller Beck pipe line

bank downstream of the area zoned for the pipeline crossing. The first mention was during an urgent telephone call, reporting crayfish climbing out of the banks. On site an hour later, the area was already fully dewatered, an excavator was standing over a partly dismantled bank and people were scrabbling about with crayfish in buckets.

The reinstatement of the streambed, carried out later, involved scattering salvaged stone over the set concrete of the pipeline-casing. The route of the temporary flume pipe was left as an open channel, leaving a small island in the channel. There was no provision for monitoring, but an inspection for white-clawed crayfish in 2003 confirmed that whilst other aquatic invertebrates had colonised the stones in the crossing area, white-clawed crayfish had not. The cobbles were sparsely scattered on the concrete bed, with few or no interstices available to crayfish. The reinstated bank may be suitable, but most of it was above normal water level and the small, submerged part was too large and stable to search. The side channel has taken a natural form. In the period since construction, the stocking density of cattle has been increased and the banks are increasingly poached, with an associated increase in silt. A brief search did not record crayfish in the vicinity, but no full survey has been undertaken.

Case study 3 – de-watering in canals

Many canals have un-mortared stone walls along the banks. Whilst they can appear muddy and unprepossessing, there can be a surprising high abundance of crayfish in the wash walls and miscellaneous urban debris, especially in canals where there has been little or no maintenance and no de-watering for a long time. The Huddersfield Narrow Canal is undergoing restoration work to reopen it to canal traffic after a period of disuse. In 2000 work was carried out to repair an aqueduct. This involved creating temporary bunds or dams within the canal and de-watering a 20m section of canal during the winter. Three successive drawdowns yielded over 500 crayfish a surprisingly high abundance considering the silty condition of the bed and only moderate water quality.

The need to install concrete walls in the aqueduct caused permanent loss of the refuges in the washwalls. Artificial refuges were installed to allow

crayfish to continue using the washwalls. New concrete walls had several rows of perforated plastic pipes attached horizontally along the walls. These had plastic netting attached to provide a “scramble-net” as access for crayfish. Subsequently, night-viewing confirmed that white-clawed crayfish were using the new structures (E. Kemp, PhD student, University Staffordshire, pers. comm.).

A de-watering exercise was carried out on another canal, to allow the construction of a new road bridge. The bridge was constructed in two separate sections, each one requiring de-watering of the canal in successive winters for many weeks. For the first de-watering, the whole canal pound was de-watered, over 400m in length. Although a crayfish rescue was carried out the length of canal affected meant that although several hundreds of crayfish were removed, many more were lost to predation and exposure. Residual areas along the bottom of the canal remained wet, but it is not known how much of the bed was suitable for crayfish.

When de-watering exercise was repeated, temporary bunds were installed and the water was pumped around the working area in a series of large pipes, limiting the de-watered area to about 150m. The critical time to carry out removal of crayfish in a canal is from the point half way down the washwalls to the exposure of the first metre or so of the bed. Further down, there tends to be less refuge material for crayfish and much more silt, which makes it a lot more difficult and messy for the rescue team. Both crayfish and fish were to be removed during dewatering. Crayfish have to be removed in the early stages, then the drawdown continues until it is shallow enough for an electro-fishing team to remove the fish. Unfortunately, having initially had insufficient pumping capacity, the contractors then rigged up a massive pump. More than three quarters of the water was drained out overnight. This made it easy for removal of fish, but fewer than 10 crayfish were recovered from stones in the channel and the lower wash walls. A sump was dug and additional pumps were used to empty the canal completely so it could be searched thoroughly, but no more crayfish were found. Although the crayfish removal did not go as planned, it seems that very few white-clawed crayfish had managed to recolonise the section of canal in the year between dewatering sessions.



Ferncliffe Road Bund and pumps

Case study 4 – reinforcing a stream bank

This project involved reinforcing one bank of a limestone stream in order to protect a railway embankment from future erosion. Reinforcement of about 80 m of 3m high stream bank was necessary. A crayfish survey was carried out, using selective manual search (Peay, 2002). Most of the stream adjacent to the actively eroding bank was a fast-flowing riffle, with a lot of loose stone and crayfish were not detected there, but there was a moderate density recorded (1.2 crayfish/10 refuges) in a glide at the upstream end of the working area.



Meanwood Beck clearance

Communications were good on this project, thanks to the keen environmental manager and a cooperative site manager. But things never go wholly to plan – the site manager had to fetch some machine parts on the morning the crayfish work started. The site staff, who were supposed to help the crayfish surveyor clear the bed, sat around waiting. The site manager was away and besides, someone had forgotten to deliver wellingtons for them! Fortunately, the environmental manager and the client's consulting engineer both arrived on site and were willing to put on their boots and jump in to help.

The works involved clearing all the cobble from a zone about 1.5m wide along the foot of the eroding bank, about a third of the channel width. This was done manually to allow any crayfish to be removed and relocated in refuges in the glide upstream. All machine-working was from the top of the bank, except immediately adjacent to the railway bridge. Lack of space and requirements for railway safety necessitated an excavator travelling along an exposed shingle bed down the right side of the channel. The bed was not fully de-watered, but 1 tonne sandbags were lowered into place to reduce the flow overall and direct it away from the working area. This formed a barrier to the movement of crayfish downstream from the unaffected area of the glide. These bags had the advantage that they could be easily lifted out again – unlike conventional sandbag dams, where most of the sand ends up in the river afterwards. Straw-bales were used as silt-traps immediately downstream of the working area and a fabric boom was positioned across the channel to mop up any oil or hydraulic fluid that seeped from the excavators.

The foot of the eroding bank and the adjacent streambed was excavated to create a flat footing below the level of the streambed. It was then lined with a geotextile. The first row of quarried stone blocks 0.6m in length was lowered into place. Clean, 100mm stone fill was placed behind the blocks and successive rows of blocks were seated on top, creating a stepped wall. The stone initially removed from the streambed was piled up against the toe of the wall, leaving water-filled interstices between the first row of blocks and among the cobble and boulders at the foot. Once completed, this provided some 80m of bank with potential refuges for crayfish along its length.

In this project, the ecologist had the opportunity to check on the progress of works during construction of the bank, to make sure the footings would be submerged and inspected the works at completion too. Unlike many projects, this one included a post-project survey. This confirmed that there was a similar abundance of crayfish in the upstream glide. The new bank retains submerged interstices that appear to be potentially favourable for crayfish. The bank and its cobble and boulder footing is now too stable for any manual searching and there is not enough room for traps to be set, so next year the intention is to see whether crayfish have moved into the desirable new residences by a night-viewing survey.

Impacts of construction and mitigation

The case studies give a few examples of relatively small-scale construction projects that are often carried out in watercourses in England. The works all cause at least temporary loss of habitat and in some instances the loss is permanent. As the case studies show, even when stone from the riverbed is replaced after works, conditions may not be favourable for crayfish.

Even if a pipeline is set low enough in the ground that a pool or glide can be created, cobble and boulder placed on the streambed will not provide any refuges unless it is piled closely and deeply enough to create interstices sufficiently large for crayfish to use as refuges. Putting stone over concrete does not provide any underlying substrate for burrowing. Gravel and sand could be laid over the surface prior to covering the bed with cobble and boulder, but the material will only stay there if the shape of the channel and the characteristics of the flow are such that it is not washed out during the first high flows in the winter. The depth at which the pipeline crosses the stream is important. For example, if the bottom of the trench is only 1m below bed level, the pipe is 60cm diameter and capped with 50cm depth of concrete, the surface of the concrete will already be 10cm above the old bed level. In a deep, slow-flowing watercourse this might make little difference. However, in a small stream that was originally only 30cm deep during normal summer conditions, this could turn an area of highly favourable glide into a fast-flowing run that is wholly unsuitable for crayfish (although this may favour other species).

De-watering may not cause any long-term loss of habitat in itself, but it exposes the bed. This may cause loss of some or all of the white-clawed crayfish population in the area and the more extensive the de-watering, the greater the loss and the longer the population will take to recover.

Available evidence from rivers is that the rate of colonisation by white-clawed crayfish is rather slow after a population is lost from an area. After an extensive loss of population, for example after an outbreak of crayfish plague, recovery may take 5-10 years or more.

If there is a population at high abundance upstream or downstream of the works area, it is likely that recolonisation will be faster than if the population is naturally at relatively low density, e.g. due to periodic losses during flood events. Even with an abundant population nearby, the rate of spread may only be 1km a year, or a lot less.

Construction project designers and project managers may need guidance on measures to minimise the impact on white-clawed crayfish. Ideally, this should occur as soon as possible at the planning stage of any construction project (Peay, 2000).

Given the highly patchy distribution of crayfish, even in streams with abundant populations, it helps in planning a project if there is information about the distribution of crayfish and relative abundance in the area that will be affected by works. Semi-quantitative surveys are recommended. Where crayfish have to be removed from an area of works there is value in obtaining as much detailed information as is practicable about the population. De-watering is a damaging operation. Where it cannot be avoided and is localised, it can provide a method of estimating population density that is not generally available. In the muddy conditions of a construction site, there will always be an under-estimate of the juvenile population, even with plenty of well-briefed helpers to retrieve the animals. Nonetheless, comparisons between prior surveys and "total" removal are of value in assessing the relative efficiencies.

Conclusions

The biggest threats to white-clawed crayfish in England are the risk of invasion of non-indigenous crayfish, crayfish plague and the water quality

and landuse in the catchment. The first two factors are also by far the most difficult to control. Nonetheless, construction work can cause temporary or permanent loss of both habitat and populations at localised or more extensive scales. The impacts occur from direct loss of refuges in banks and channel. They may also occur from de-watering operations or pollution incidents. Whilst pollution risk can be minimised by good construction practice, specific mitigation measures are needed to minimise impacts on white-clawed crayfish. This may involve removal of crayfish from the working area and reinstatement of habitat afterwards, if possible.

Construction work is not always damaging in the long term. De-silting of a river, lake or canal will undoubtedly have impacts at the time of works, but may expose or allow the provision of new refuges for crayfish. If banks and margins are retained undisturbed, crayfish may be able to recolonise readily. Some types of bank re-inforcement can provide complexity of structure and hence offer refuges that would be absent in highly modified waterbodies with uniform sloping banks (see Peay, 2003).

The impact of construction on particular populations of crayfish depends on the population and habitat that will be affected and on the specific detail of works. Mitigation measures are not always applied and even where they are, they may have only partial effectiveness. Individual projects may be localised or extensive. Mitigation measures need to be carefully tailored to the individual sites and works to be successful. Considering what constitutes favourable habitat for individual crayfish will help in the design of measures that work at a site scale.

Recovery of white-clawed crayfish populations may take several years, even if good habitat is still available after works.

Post-project monitoring is rarely carried out. This means problems may not be identified and may be repeated in schemes in future.

Although a project may involve advance surveys and planned mitigation measures, the success of these depends on the detail of how they are implemented during construction. Good site supervision is essential, as is good communication between site staff and the ecologist. The consulting engineer needs to know what is to be done, but it is even more important that those on site understand what is needed and when – and conversely, that the ecologist understands the construction environment and the constraints that contractors operate under. Giving people on site an opportunity to “meet the crays” before the start of any crayfish rescue helps to generate some local enthusiasm (plus plenty of quips about whether they are good with chips).

Construction work involving watercourses is still subject to the usual vagaries of breakdowns, staffing, weather conditions and other unplanned events. Even with a good environmental site manager and one or more ecologists with specialist knowledge of crayfish on hand, measures will not always work as planned. Good construction management will include an environmental risk register and contingency plans for the problems that are most likely to occur. Once the work on site is finished, however, unless an outcome is explicitly detailed as a planning condition, it is difficult to ensure any improvement is undertaken retrospectively.

The fairest and most cost-effective fee basis is generally for the project ecologist to carry out the crayfish mitigation work on the construction site on a time-fee basis, given that the time required is usually under the control of the site staff, rather than the consultant. If the contractor insists on a lump sum for your component of the project, it is advisable to either include

either plenty of caveats, or a significant contingency allowance!

To be as effective as possible, mitigation measures for works affecting white-clawed crayfish need the following:

- advance surveys;
- measures to minimise losses of crayfish during works;
- measures to reinstate or compensate for loss of habitat;
- mitigation measures incorporated into the design and the detailed method of work and adequately allowed for in the budget;
- good control of works on site and in the detail of reinstatement, including good staff briefing and supervision;
- contingency plans to cope with weather, breakdowns, spillages and other events;
- good data collection and full reporting, including acknowledgement of problems or deficiencies, to enable better planning of future projects, and
- subsequent monitoring, preferably budgeted into the project at the start.

There is still scope for improvement in measures to minimise the impacts of construction on white-clawed crayfish and to provide the best habitat restoration or improvement. Nonetheless, there is a growing awareness among the regulators, environmental consultants, project engineers and contractors that white-clawed crayfish should be taken into account in projects. The more that best practice guidance is made available and is implemented, the better the projects will be in future.

If readers undertake crayfish projects and are willing to provide details, especially population data obtained by various methods, these would be appreciated.

References

Peay, S. (2000). *Guidance on Works Affecting White-clawed Crayfish*. English Nature, Peterborough. 27pp. (available from English Nature, Peterborough)

Peay, S. (2002). *A Standardised Monitoring Protocol for White-clawed Crayfish, Austropotamobius pallipes in the UK SAC Rivers*. Life in UK Rivers Project. Contract LIF 02-11-37. English Nature, Peterborough. 58 pp. (can be downloaded, together with survey forms, from <http://www.english-nature.org.uk/LIFEinUKRivers/species/crayfish.html>)

Peay, S. (2003). *Guidance on habitat for white-clawed crayfish and how to restore it*. R&D Technical Report W1-067/TR. Environment Agency, Bristol. 66 pp. (available from www.eareports.com)

Sibley, P.J., Brickland, J. H. & Bywater, J. A. (2002). Monitoring the distribution of crayfish in England and Wales. In: Knowledge-based management of European native crayfish. Crayfish special Vol. 4, (eds C. Souty-Grosset & F. Grandjean). *Bulletin Français de la Pêche et de la Pisciculture*, **367**(4), 833-844.

Taylor, E. W. & Wheatly, M. G., (1981); The effect of long-term aerial exposure on heart rate, ventilation, respiratory gas exchange and acid-base status in the crayfish *Austropotamobius pallipes*. *Journal of Experimental Biology* **92**, 109-124.

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In the Journals

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British Ecological Society

S. McIntyre, K. M. Heard and T. G. Martin.

The relative importance of cattle grazing in subtropical grasslands: does it reduce or enhance plant biodiversity?

Journal of Applied Ecology 2003, **40**: 445 - 457.

Although this research is based in Eastern Australia, the importance of livestock grazing impact on grassland biodiversity remains relevant within the temperate climate of the UK. Livestock grazing enterprises have potentially threatening effects on the conservation of plants in grassy subtropical eucalypt woodlands. Commercial levels of grazing could cause local extinctions of sensitive native species and/or reductions in abundance and species richness in native pastures.

The authors studied the nature of grazing impacts on the diversity and composition of herbaceous plants and used a natural experiment to analyse the effects of disturbances (cattle grazing, soil disturbance, water enrichment) and environment (lithology, slope position, presence of trees) on plant community composition in eastern Australia. Pastures and reserves were sampled at 191 sites over an area of 3000 ha.

The data did not support the hypothesis that grazing increased species density at small scales but decreased it at landscape scales, due to the elimination of grazing-sensitive species. However, there were more native species that declined with increasing grazing and more exotic species that increased with grazing in the assemblage.

For land managers to retain plant diversity on grazed landscapes, it would be desirable to provide a full range of grazing pressures, including areas protected altogether. This would apply to all plant communities where both species that declined with increasing grazing and more exotic species that increased with grazing are present.

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S. K. Finney, M. P. Harris, L. F. Keller, D. A. Elston, P. Monaghan and S. Wanless.

Reducing the density of breeding gulls influences the pattern of recruitment of immature Atlantic puffins, *Fratercula arctica* to a breeding colony

Journal of Applied Ecology 2003, **40**: 545 - 552.

This paper considers the impacts of a highly competitive and predatory species groups' impacts on the recruitment of another species with which it interacts. It is interesting to see the relationship caused by a species that is both a competitor and predator and the subsequent impacts on the spatial distribution of the victim species. I would recommend this paper to site managers where one dominant bird species is having significant impact on a conservation species. Gulls (*Larus spp.*) act as both competitors and predators and are considered to significantly reduce the attractiveness of potential breeding sites for other birds. This perceived threat posed by gulls

to other breeding birds has led to the implementation of gull control procedures at many seabird colonies. However, the extent to which reducing gull numbers benefits other species has received little rigorous scientific investigation.

During a gull control programme (1972-89), gull nest density on the Isle of May, south-east Scotland, was reduced by between 30% and 100% in different sections of the island. Following termination of the original programme in 1989, several sections were maintained as gull-free by repeated removal of nests. Data was collected over a 23-year period to determine the extent to which the spatial variation in puffin *Fratercula arctica* recruitment was influenced by changes in the density and spatial distribution of breeding gulls resulting from the control programme. The presence of breeding gulls significantly affected the pattern of recruitment of puffins to the colony. Puffin recruitment rate was highest in the sections of the island where gull nest density was low. Gull density explained 21% of the variation in puffin recruitment rate.

These results suggest that the reduction in the number of breeding gulls substantially increased the attractiveness of areas of the colony as breeding sites for puffins, and is thus likely to have played an important role in the pattern of expansion of the puffin population on the island. Following a recent increase in the conservation status of both herring *L. argentatus* and lesser black-backed gulls *L. fuscus*, there has been a move to make management decisions more objective. This has highlighted the need for studies such as this, aimed at assessing the impact of gulls and their removal on other breeding birds, to ensure that any future control programmes are both necessary and effective.

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G.V.Watola, D.A. Stone, G.C.Smith, G.J.Forrester, A.E.Coleman, J.T.Coleman, M.J.Goulding, K.A.Robinson and T.P.Milsom.

Analyses of two mute swan populations and the effects of clutch reduction: implications for population management.

Journal of Applied Ecology 2003, **40**: 565 - 579.

The accidental or deliberate release of alien species may be very disruptive to native biota, principally through competition or predation. Naturalized populations of mute swans, *Cygnus olor*, in western Europe and North America have overgrazed native aquatic vegetation, competed with other waterbirds, and damaged arable and fodder crops.

Numbers may be controlled by destroying or oiling a proportion of eggs in each clutch to prevent hatching (clutch reduction).

A difference equation model was used to examine the effectiveness of clutch reduction (destroying or oiling a proportion of eggs) on a mute swan population in the Wyllye Valley, Wiltshire. Model parameters were derived mainly from a long-term study of individually marked birds. The model focused on the non-breeding subpopulation, considered to have a negative impact on local fisheries by overgrazing aquatic macrophytes.

Annual survival rates were high in both populations, ranging between 68% and 73% for juveniles, first-years and non-breeding adults, and between 72% and 90% for breeding adults. Immigration was an important factor in the dynamics of both populations.

The effects of different levels of clutch reduction on the Wyllye Valley mute swan population were simulated. Reducing clutches to two eggs per clutch lowered non-breeding numbers by 30% over a 10-year period. Total destruction of all eggs in each clutch stabilized the non-breeding subpopulation but did not eradicate it. The effects of clutch reduction were offset by high survival rates and immigration.

The model was also tested for another swan population in the West Midlands, UK. Here the simulated restriction of clutches to two eggs stabilized the

non-breeding subpopulation but did not affect breeding numbers. Total destruction of all eggs in each clutch markedly reduced the non-breeding subpopulation.

Clutch reduction is labour intensive, requires persistence to be effective, and its effects may vary between populations depending on immigration rates. This study demonstrates that control of breeding output did not alleviate a localized conflict. Deterrent measures and habitat management at the site of conflict may be more effective.

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Mute Swan

E. Marboutin, Y. Bray, R. Péroux, B. Mauvy and A. Lartiges.

Population dynamics in European hare: breeding parameters and sustainable harvest rates.

Journal of Applied Ecology 2003, **40**: 580 - 591.

This paper advises managers that a two-stage management strategy (e.g. first computing an estimate of population size based on numbers killed very early in the shooting period, then defining flexible harvest quotas) would help to cope with the unpredictable dynamics of the species and resulting fluctuations in hare numbers. Hares, *Lepus europaeus*, are considered to be a valuable game species in most European countries. Hunting needs to be sustainable and sound management of hare populations requires some knowledge of the species' demographic variability, especially regarding the breeding output, which is highly time- and space- dependent and may govern the population size and exploitability.

Using shooting bag analysis and placental scar counts, mean fecundity and leveret survival were estimated at four study sites with contrasting hare numbers and density trends. Harvest rates and adult natural survival rates were incorporated into a matrix projection model to analyse the population growth rate sensitivity and to derive indices of sustainable harvest rate.

The results of this study suggest that sustainable shooting of hares is possible provided some local data about their dynamics are available and slightly conservative quotas are used. Modelling approaches have potential in assessing the latter, but also as a check on the coherence of the estimates of the former.

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C. Riginos and M. Timm Hoffman.

Changes in population biology of two succulent shrubs along a grazing gradient.

Journal of Applied Ecology 2003, **40**: 615 - 625.

Heavy livestock grazing in Namaqualand, South Africa, is threatening the region's unique diversity of succulent shrubs. This is especially true in the communally managed lands, where grazing is centred on fixed enclosures (stockposts) in which animals stay overnight. In this study the authors set out to determine the effects of a semi-permanent stockpost on the composition of the surrounding vegetation and the mechanisms by which grazing limits the persistence of these shrub populations.

The authors used the grazing gradient created by a stockpost to examine the impacts of grazing on vegetation composition and changes in mortality, reproductive output and seedling establishment for shrub species *Ruschia robusta* and *Cheiridopsis denticulata*. Vegetation composition was found to change from a community dominated by the unpalatable shrub *Galenia africana* at high grazing intensities to a community dominated by the palatable leaf-succulent shrub *R. robusta* at lower grazing intensities.

This study demonstrates that different zones of vegetation composition can develop around a fixed stockpost and the greatest impact of grazing on the two shrub species studied is the suppression of flower and fruit production. Consistent suppression of reproductive output could have long-term consequences for the persistence of succulent shrub populations in the heavily grazed communal lands of Namaqualand. The authors recommend that (a) herders should be encouraged to relocate their stockposts regularly to prevent the development of centres of degradation, and (b) areas should be relieved periodically of all grazing pressure to allow for successful seed set of native shrubs.

M.W. Miller, A. Aradis and G. Landucci.

Effects of fat reserves on annual apparent survival of blackbirds *Turdus merula*.

Journal of Animal Ecology 2003, **72**: 127 - 132.

Fat reserves are stored energy that may help birds survive periods of harsh winter weather. This hypothesis predicts that annual apparent survival is higher for birds with large fat reserves than for birds with few or no fat reserves in winter.

Blackbirds (*Turdus merula* L.) were ringed in central Italy from 16 November to 20 February during 1990-2001. Fat scores were recorded for each bird. Capture-mark-recapture data for 1703 blackbirds were used to estimate the effect of large fat reserves on annual apparent survival, while controlling for transients, using computer programs survive and mark. Probability of birds retaining large fat reserves, or retaining few fat reserves, over 2 successive years was also estimated.

Birds with large fat reserves did not have higher estimated annual apparent survival than birds with few fat reserves, which was inconsistent with the prediction. No effects of age, sex or year were detected on annual apparent survival. Birds with few fat reserves in any given year tended to have few fat reserves the following year. Birds with large fat reserves in any given year were unlikely to have large fat reserves the next year.

Large fat reserves may not increase annual survival of blackbirds wintering in central Italy. Winter weather in our study area may be too mild to effect survival. Alternatively, increased predation risk associated with large fat reserves may counteract any benefits of reduced starvation risk.

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S. Devillard, L. Say and D. Pontier.

Dispersal pattern of domestic cats (*Felis catus*) in a promiscuous urban population: do females disperse or die?

Journal of Animal Ecology 2003, **72**: 203 - 211.

The domestic feral cat (*Felis catus* L.) is a good model for studying intraspecific variability of dispersal patterns in mammals because cats live under a large diversity of socio-ecological conditions. The authors analysed both the natal and breeding dispersal patterns of domestic cats in a Promiscuous urban population and tested whether or not it differed from the male-biased natal dispersal pattern observed for polygonous rural populations.



During an 8-year study they recorded the exact date of in situ death for 148 marked cats and the exact date of disappearance from the population for 99 other cats. Because undiscovered deaths might over-estimate dispersal probabilities when considering only disappearance probabilities, they made a novel application of multistrata capture-recapture methods in order to disentangle dispersal from true mortality.

It was shown that mature females dispersed, both before and after their first reproduction, at 1 and 2 years old. Contrary to females, no dispersal seemed to occur in males. Before sexual maturity, females that disappeared at 1 and 2 years old were in worse body condition than females that stayed in the population area after 2 years old. However, they did not reproduce less successfully before their disappearance than females that died later in the population area.

The female-biased and low natal dispersal pattern in this population was atypical compared to other promiscuous/polygynous mammals and differed from that observed in rural polygynous populations of domestic cat. Neither local mate competition nor inbreeding avoidance appeared to be sufficient pressures to counterbalance ecological constraints on dispersal in an urban environment. However, local resource competition for den sites between potential matriarchies could lead to the breeding dispersal of less competitive females.

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T. Sendor and M. Simon.

Population dynamics of the pipistrelle bat: effects of sex, age and winter weather on seasonal survival.

Journal of Animal Ecology 2003, **72**:308 – 320.

Life-history theory assumes increased mortality at certain stages such as hibernation. However, seasonal variation of survival rates of hibernating mammals has rarely been estimated. In this study, the apparent survival of pipistrelle bats (*Pipistrellus pipistrellus*) hibernating and performing summer



Pipistrelle bat

swarming at a large hibernaculum (Marburg Castle, Hesse, Germany), was modelled using seasonal (summer/winter) capture-recapture data for the years 1996-2000.

In five summers and four winters, 15 839 bats were captured and released (13 082 individuals) and 3403 recaptures recorded.

Survival could be modelled using two age-classes, with reduced first-year juvenile survival. The age effect persisted over the first autumn and spring. There was virtually no evidence for sex-specific survival rates; male and female survival were found to be almost equal. In the best-fitting models, survival rates varied over time and differed among sexes and age-classes by a constant amount. Between years, there was only a small variation in spring survival, which could not be explained by winter severity.

Adult spring survival was surprisingly high, averaging 0.892. No evidence for increased mortality during hibernation could be found. This contradicted the expectation of reduced over-winter survival due to depleted fat reserves at the end of hibernation. Thus, hibernation does apparently not entail a survival cost for the pipistrelle bat. Rough estimates of annual adult survival averaged 0.799, which considerably exceeds previous estimates; annual juvenile survival was estimated at 0.527. Hence, previous studies have substantially underestimated pipistrelle bat survival. Possible consequences of these findings for various aspects of life histories are discussed.

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H.B.M. Tomassen, A.J. P. Smolders, L.P.M. Lamers and J.G. M. Roelofs.

Stimulated growth of *Betula pubescens* and *Molinia caerulea* on ombrotrophic bogs: role of high levels of atmospheric nitrogen deposition.

Journal of Ecology 2003, **91**: 357 – 370.

Increased levels of atmospheric nitrogen continue to be a cause for concern and this paper deals with its significance in bogs. The purpose was to test whether the observed invasion of ombrotrophic bogs in the Netherlands by purple moor-grass (*Molinia caerulea*) and grey birch (*Betula pubescens*) is the result of long-term high nitrogen (N) loads. A 3-year fertilization experiment with *Sphagnum fallax* turfs was set up with six different N treatments applied ranging from 0 (control) to 4 gN m⁻² year⁻¹.

During the experimental period, ammonium concentrations in the peat moisture remained very low due to high uptake rates by *Sphagnum*. Tissue N concentrations in *S. fallax* showed a linear response to the experimental N addition.

Despite the high tissue N : P ratio (above 35), above-ground biomass production by *Molinia* was still stimulated at N addition rates of 4 g m⁻² year⁻¹, and foliar nutrient concentrations were unaffected compared to the control. In contrast to *Molinia*, *Betula* was unable to increase its above-ground biomass. Foliar N concentrations in *Betula* were significantly higher at N addition rates of 4 g m⁻² year⁻¹ and excess N was stored in foliar arginine, making up 27% of the total N concentration. Evapotranspiration was increased at higher N addition rates due to stimulated total above-ground biomass production of the vegetation.

N addition at the actual Dutch deposition rate of 4 g m⁻² year⁻¹ stimulated the growth of *Molinia* in this experiment, providing evidence that the observed dominance of *Molinia* on ombrotrophic bogs in the Netherlands is caused by high N deposition levels. Based on the observed changes in biomass production and tissue nutrient concentrations, the authors concluded that a long-term deposition of 0.5 g N m⁻² year⁻¹, or higher, leads to undesirable changes in species composition and increased risk of desiccation.

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Molinia grassland

E. Imbert and F. Lefèvre.

Dispersal and gene flow of *Populus nigra* (Salicaceae) along a dynamic river system.

Journal of Ecology 2003, **91**: 447 – 456.

One of the assumptions at the IUCN World Parks Congress was that ecological corridors are a good thing. While this may be true for larger animals and migratory species, other species may respond in quite different ways and may be unable or disinclined to move along such corridors even when available. This paper deals with one of the most obvious ecological corridors – a river.

Genetic markers were used to study gene flow of the riparian pioneer tree species the black poplar, *Populus nigra* along the Drôme river (France). This dioecious species is supposed to have more efficient dispersal mechanisms for pollen (wind) and seeds (wind and water) than other trees. Seedlings belonging to the same reproduction/migration event were sampled in 22 riparian forest fragments along the river and their genetic diversity assessed through six nuclear microsatellites.

The authors found a high level of diversity and significant differentiation among populations. The significant isolation by distance pointed to rejection of the infinite island model of migration.

Gene flow parameters were higher in the upper, mountainous part than in the alluvial plain downstream. There was no accumulation of diversity downstream, indicating migration rates were symmetrical upstream and downstream. This was confirmed by computing individual migration parameters between adjacent populations.

The results are discussed with regard to the dispersal mechanisms of seeds and pollen. The discrepancy between potential gene flow and effective gene flow is interpreted as an effect of fragmentation, due to the alteration of the natural dynamics of the riparian ecosystem rather than to physical barriers. Correspondence: e-mail: lefevre@avignon.inra.fr

J. Lienert and M. Fischer

Habitat fragmentation affects the common wetland specialist *Primula farinosa* in north-east Switzerland

Journal of Ecology 2003, **91**: 587 - 599

It is a useful co-incidence that this article appears in the same volume as the Flora of the British Isles reported below.

Habitat fragmentation reduces size and increases isolation of plant habitats, and increases the ratio between edge and centre area. The consequences of habitat fragmentation have rarely been studied for common plants, and edge effects are rarely studied for plants in general. The authors studied

density, population structure, fitness components and biotic interactions in the locally abundant distylous fen plant *Primula farinosa* in the centres and at the edges of 27 Swiss fen habitats of different size and degree of isolation.

Population sizes ranged from 80 to 106 450 flowering plants and were larger in larger fen habitats than in smaller ones.

The densities of plants were lower in more isolated habitats (by 26-46% depending on developmental stage). In the less isolated habitats, the density of seedlings and juveniles was higher in larger habitats. Plant densities were lower at the edge than in the centre of habitats (34-55%), and edges had fewer plants of younger developmental states. Densities of reproductive plants differed only in the centres of habitats, where they were higher in larger habitats, while at the edges these densities were independent of habitat area.

Flower morph proportions were independent of size and isolation of habitats. Plants in larger habitats had larger rosette diameters and tended to have more flowers.

At the edges, seed set was on average 11% lower, and occurrence and degree of herbivory more than 50% higher than in centres. Grazing of capsules was less likely in larger habitats. Infection by the smut fungus *Urocystis primulicola* was more likely in larger habitats.

The authors conclude that size, isolation and edge to centre ratio of fen habitats all affect *P. farinosa* and recommend that edge effects on other more common species are given more attention.

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T. B. H. Reusch.

Floral neighbourhoods in the sea: how floral density, opportunity for outcrossing and population fragmentation affect seed set in *Zostera marina*.

Journal of Ecology 2003, **91**: 610 – 615.

Eel grass, *Zostera marina*, is an important indicator species of marine habitats, especially in the Mediterranean. The author observes that almost nothing is known about how the floral neighbourhood affects reproductive output in plants with subaqueous pollination (hydrophily), such as seagrasses, an ecologically important group of some 60 marine angiosperms.

The study concentrated on how seed set in *Z. marina*, a functionally hermaphrodite seagrass with extensive clonal propagation was affected by floral density, genetic diversity and population fragmentation affect.

In a field experiment in the south-western Baltic Sea, the density of flowering shoots was increased or decreased in 6x6m plots. Early seed set was a positive, saturation-type function of density suggesting pollen limitation below approximately 5 flowering shoots m⁻². Early seed set was 22% lower in isolated vegetation patches compared to continuous eelgrass meadow (> 50 m⁻²).

Given the spatial scale of the observed pollen limitation, and low natural densities of flowering shoots in the field, pollen limitation may be widespread in *Z. marina* and, possibly, other plant species with subaqueous pollination. Correspondence: e-mail: reusch@mpil-ploen.mpg.de

D. J. Hambler and J. M. Dixon

Biological Flora of the British Isles No. 230 - *Primula farinosa* L.

Journal of Ecology, 2003, **91**: 694 – 705.

This species, the birds eye primrose, is of limited distribution in the UK, being found mainly in the northern Pennines from Cumbria to Northumberland. It occurs on damp calcareous grassland and flushes on Carboniferous or Magnesium Limestone. Within Europe it seems confined mostly to the Alps, Pyrenees and southern Sweden and Estonia. The topics covered are the usual. There is a useful reference list although, as a species, it has been less researched than some. There is no doubt that the species is declining in the UK with complete loss from Scotland (note that *P. scotica*, although similar is regarded as a separate species). The main cause of the decline has been loss of habitat through drainage, manuring, fertilization, resowing and overstocking.

I do wonder, however, whether with all the work that goes into the production of articles in this series, more attention could be given as to how this information might be used. For example would it really have hurt if the words *birds eye primrose* had crept in somewhere? And there ought to be a checklist as to whether a particular species has a conservation status - e.g. Red Data List or UK BAP programme etc. Compared to the work that goes into the papers, this is a small addition to ask.



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News from the North East Section: Review of the year

Andy Cherill, MIEEM and Steve Pullan, MIEEM

The year began with the formal launch of the North East Section at the national conference in Newcastle Upon Tyne. Since then the committee has met on several occasions to organise evening and field events within the region. These events have continued to attract varying numbers of members and non-members alike. The first meeting in January was on re-wilding and Peter Samson (Northumberland National Park Authority) showed how this concept was developing across Europe. In March Sam Ellis (Butterfly Conservation) spoke on butterflies in the north east and highlighted the major conservation issues and threats. Then on a magnificent spring day in May, Duncan Glen (Defence Estates) gave us a conducted tour of the Otterburn ranges and illustrated the conservation measures being undertaken following the Public Enquiry on deployment of the large AS90 guns. We travelled into the heart of the range, dodged a number of unexploded shells, and had a really interesting day. At the year's last meeting in September, Andy McNaught and Cara Courage (DEFRA) gave highly informative talks on potential changes to CAP and Agri-environment schemes. We are extremely grateful for the contributions of this year's speakers and would also like to thank Durham Wildlife Trust, Northumberland Trust, the MOD, Northumberland National Park and DEFRA for providing venues for our gatherings (at no cost to members).

The NE Section's first AGM was held on 10th September. Rob Mayhew and Mary Gough stood down from the committee, while Steve Pullan (convener), David Feige and Andy Cherrill were re-elected. We also welcome new members to the committee; Liz Allchin, Steve Betts (both of Entec) and Ian Bond (currently Countryside Warden for Stockton BC, but shortly to take up the post of ecologist with Hartlepool BC). The committee will be reviewing the activities of the NE Section. As part of this programme members were recently asked to complete a brief questionnaire. There are approximately 50 members in the NE Section, an increase of 12 from the numbers included in the 2001 directory. Around 45% of members are consultants (reflecting the national picture). The remainder work in industry, local authorities, wildlife trusts, education, English Nature, the National Park and government departments.

Around 30% of members returned the questionnaire – not as many as we had hoped, but still a useful snapshot. Feedback on regional meetings was very positive praising their relevance, interest and the opportunities provided for networking. Out of 14 suggested topics for future evening and field meetings only three (practical habitat management, protected species legislation, and habitat creation/restoration) were suggested more than once. This reflects the wide diversity of interests and backgrounds of members in the NE. Informal records of attendance at meetings suggest that perhaps half of all NE members have not attended to date. Feedback suggests, not surprisingly, that this can be attributed to pressures of time, compounded in some cases by the locations of the venues. It is hoped that using new venues over the next year will provide opportunities for these members to attend.

The questionnaire asked about attendance at IEEM short courses. While it is clear that NE members are accessing the national programme, there is

unfulfilled demand for local provision. A wide range of topics was suggested, although survey techniques (particularly for protected species and habitats) and species identification were the dominant themes. A series of questions sought to address the range and priorities of potential activities for the NE Section. A consistent response was that we should prioritise recruitment within the region and this was a key issue. Members returning questionnaires indicated that they were aware of over 80 colleagues who are potentially eligible for membership, but who have not been persuaded of the benefits of applying. If this pattern is replicated across the region it suggests that there is substantial potential for growth within the region.

Growth in membership has been identified as a priority at the national level. Growth is critical for continuing momentum in developing activities and services for NE members. With a relatively small number of members in the NE we need a correspondingly high proportional engagement by regional members to maintain the range of field and evening events. An increase in membership would allow the Section to expand activities into areas highlighted in the questionnaire. These include short course provision, offering a conference with a NE flavour and consulting on regional issues. At present the latter appears to be beyond the resources of the Section and its committee. However, we are committed to developing the Section further. Over the next 12 months we will continue to organise a range of evening and field meetings, investigate opportunities for short courses, and prioritise recruitment of members as an activity that will underpin the future success of IEEM regionally and nationally.

Finally, we are in the process of updating members' contact details. Most members have indicated that email is their preferred method of receiving information about regional activities. If you did not receive the questionnaire, then we do not have your current email! To update our records, to offer any comments, or make suggestions for future meetings, please contact the committee at: steve.pullan@defra.gsi.gov.uk

NEXT MEETING

19 November. North East Section Meeting - The Water Framework Directive **Dr Martyn Kelly, MIEEM.** Northumberland Wildlife Trust, The Garden House, Jesmond Newcastle. Details from the North East Section Convener Steve Pullan, e-mail: steve.pullan@virgin.net.

Andy Cherrill is Senior Lecturer, Ecology Centre, University of Sunderland and Steve Pullan is Project Officer for DEFRA - RDS

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Recent Publications



Mountains - Scotland's Living Landscapes

Author: Mark Wrightham

ISBN: 1853973262

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Mountains and wild uplands cover two thirds of Scotland. From the shattered gabbro of the Skye Cuillun to statuesque sentinels such as Suilven and Ben Loyal in Sutherland, the steep ridges of Lochabar to the boulder plateaux of the Cairngorms, the mountain ranges are unique and spectacular.

Scotland's mountains may appear small along side the Alps or the Himalayas, but this comparison is deceptive. The highest peaks extend more than 600m above the limit of tree growth and their natural environment and wildlife have much in common with summits in the Pyrenees or Norway. Long-lived snow beds linger in the shadowy recesses of Ben Nevis and the Cairngorms.

The mountains record the immense geological forces that shaped Scotland over a million years. They are the most extensive near natural areas in Britain, with habitats, plants and animals that are rare or absent elsewhere in the world. They are well-known landmarks and symbols of national identity, enriching lives of local residents and those who visit for recreation. But these unique mountain landscapes and their wildlife are also vulnerable to use and demand the highest standards of stewardship.

This book provides an exciting glimpse into the beautiful landscape that Scotland boasts. Split into four parts: **The Ancient Foundations** – briefly looking at the origins of Scotland's mountains and volcanoes, **Ice sculptures** – discusses the role of ice in shaping the Scottish landscape, **The Mountains Today** – discussing the habitats, vegetation and wildlife and **Mountains and People** – cover the range of uses people make of the mountains including recreation and land use.



Land Cover Change Scotland from the 1940's to the 1980's

Format: CD

Author: Scottish Natural Heritage

Price: £5

Available from: SNH publications
pubs@snh.gov.uk

Looking back over the latter-half of the twentieth century, considerable changes have become evident in Scotland's urban and rural environments. This is a CD-Rom produced by Scottish Natural Heritage as part of the National Countryside Monitoring Scheme (NCMS). NCMS is a pioneering study to provide robust, quantitative data on changes in Scotland's land cover. By interpreting and mapping aerial photography from around 1947, 1973 and 1988 for 467 representative locations throughout Scotland, the NCMS was able to estimate the extent of change between these years at a national and regional scale. This enabled habitat change throughout Scotland to be quantified for the first time.

The NCMS Visualisation and Analysis System is an advanced ArcView GIS application which allows full interactive access to the NCMS dataset allowing you to examine land cover sequences within 467 sample squares and estimate change within geographical areas. The GIS tools are divided into two broad categories: **Viewing tools** enable maps of land cover to be

displayed for NCMS sample squares. **Analysis tools** enable the definition of geographical regions of interest for estimating land cover stock and change, extrapolated from sample data

The system is apparently straightforward to use. However a basic knowledge of ArcView ® is thought of as helpful to make best use of the analysis tools and results. An understanding of statistical sampling and estimation is also recommended.



Conservation and Conflict - Mammals and Farming in Britain

Edited: Will Manley, MIEEM and Fran Tattersall

ISBN: 184100015

Price: £38

Available from: The Mammal Society

This volume presents, in large part, the proceedings of a conference on this subject held by the Mammal Society and the Linnean Society in November 1999. Whilst it is a very welcome addition to the literature, it does seem regrettable

that the proceedings have taken so long to produce, particularly given the events in British agriculture over the last four years. This leads to the papers being difficult to place in time: some read as though they were written at the time of the conference, others were clearly written as recently as 2002. The reader is left wondering why, in many cases, there is no mention of the Curry report, the foot and mouth crisis, or GMOs.

Aside from this minor quibble, the book is informative, with a very broad perspective, and a good balance of papers from academics, government researchers, conservationists (if that term is permissible) and major landowners.

The volume is divided into three sections: the farmed environment; ecology and conservation; and economic impacts. The farmed environment sections covers issues such as the impacts of agri-environment schemes, the effects of agricultural pesticides on mammals, and the views of farmers in relation to their role as 'custodians of the countryside'. Macdonald and Johnson's introductory paper on the role of farmers in conservation in particular pointed out the willingness of farmers to participate in conservation action, but also the gap between awareness or interest in the environment and sound management practice.

The ecology and conservation section includes several important autecological papers giving both academic research results and conservation guidance. Of particular note is Duverge and Jones' paper on Habitat Use by Greater Horseshoe Bats, which not only provides an interesting summary of Laurent's PhD research, but also provides clear recommendations for the management of habitats for greater horseshoe bats. Other papers on the diet of foxes, and arable wood mice, whilst interesting, were slightly more esoteric.

The economic impacts section, although comprising almost half the volume, was dominated by the three papers on the current strategy to control bovine TB by the culling of badgers. Perspectives are presented from the independent scientific group, led by Professor Bourne, and from two of the most respected research groups in this area, led by Stephen Harris and by Chris Cheeseman. These three papers do merit reading together. The remainder of the section deals with those species traditionally thought of as economic pests of farming: primarily rabbits, rats and foxes. It was good to see attempts made to quantify the levels of damage caused, and interesting to note, in the paper by Putman and Kjellander, that damage by deer rarely was of economic significance.

Overall I found this a very useful and interesting volume and, due to the short format of the papers, I could read the entire book on the train to Sheffield and back. If you have an interest in mammals or the conservation of the British countryside, I suggest you do the same (without necessarily the Sheffield part obviously!).



What might a British forest-landscape driven by large herbivores look like? English Nature Research Report no. 530

Author: Keith Kirby, MIEEM

ISSN: 0967-876X

Price: Free

Available from: www.english-nature.org.uk

Frans Vera's book *Grazing ecology and Forest History* (published by Wallingford, 2000) has stimulated much debate about the nature of the former natural forest cover of western Europe. It

also raised questions about the role of large herbivores in the management of nature conservation sites under current conditions.

In this report, the author explores what the structure of the wildwood might have been like, using Vera's hypothesis as a starting point for a simple landscape model. His initial ideas were presented at a British Ecological Society Winter Meeting in December 2002.

The model is simple, but does illustrate that a number of different landscape outcomes are possible within the framework of the Vera hypothesis. This has implications for how data from pollen or invertebrate remains are interpreted, but also for attempts to apply Vera's ideas to modern conservation management.

The debate about the role of large herbivores in natural forests and in modern management still has further to go and this report pushes the discussion further.



Habitat translocation - a best practice guide

Author: Penny Anderson, MIEEM

ISBN: 0 86017 600 2

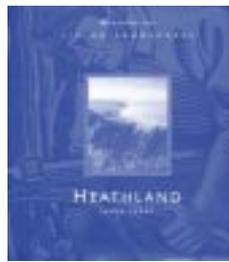
Price: CIRIA non-members - £85.50
CIRIA members - £40.50

Available from: www.ciria.org.uk

Habitat translocation is the process of moving soils with their vegetation and any animals that remain associated with them, in order to rescue habitats that would otherwise be lost due to a development or extraction scheme. Such activity

is usually associated with habitats of significant nature conservation value where a decision has been made to move them rather than lose them totally to another land use.

This best practice guide sets out minimum standards for habitat translocations. While researched originally for the Highways Agency, this guide has been broadened to apply to any construction project. This guide does not promote translocations, as translocation should be regarded as a last resort for all sites of high nature conservation value. Instead, it seeks to set high standards to help avoid some of the failures found in past translocation projects. The guide should raise standards and reduce the risks that emanate from poor practice. This guide should lead to the incorporation of better and more successful habitat translocation schemes in development projects. The guide is accompanied by a CD, which contains details of a review of more than 30 habitat translocation projects undertaken in the last 20 years. Findings from the review formed the basis for the recommendations in this very useful guide.



Heathland

Author: James Parry

ISBN: 0 7078 0348 9

Price: £18.99

Available from: www.nationaltrust.org.uk or 01394 389950

The last two centuries have seen the loss of more than 80 per cent of British heathland, either smothered under swathes of intensive agriculture, forestry, roads and housing, or left unloved and unmanaged to become overgrown by scrub and woodland. The decline of lowland heath also signalled a crisis for the range of specialised wildlife that lived there. From the sun-loving sand lizard to the gorse-dependant Dartford warbler, a fascinating and diverse flora and fauna, much of it rare and highly localised, is supported by heathland.

In this book, James Parry explores the world of the lowland heath, tracing its social and cultural history and looking at the lives of those who made the heath their home, at the rich variety of wildlife found there, and at the issues that now face our heathlands. With greater awareness and resources now devoted to their conservation, our heaths are enjoying something of a renaissance and their future is looking increasingly hopeful.

This is the third title in the National Trust's *Living Landscape* series and the book is fully illustrated with contemporary and historical photographs, as well as specially commissioned wildlife watercolours.

New Articles Needed

Articles for *In Practice* are always needed.

Each page takes about 1,200 words and papers are welcome up to 4 pages, preferable in 1-page units.

It helps to have articles with good quality illustrations, photos or slides.

We reserve the right to edit or not to publish but most IEEM members who have submitted articles to date have had them published.

Institute News

Notice of Institute AGM

Don't forget the Institute AGM will be held on 26th November at the Palace Hotel, Buxton, starting at 17.30. All members are welcome and entitled to attend whether or not they have registered for the Conference on Upland Ecology.

Buxton Conference

Bookings are coming in at a steady pace for what promises to be a very successful occasion. On previous conferences we have provided entertainment that reflected the particular area - Northumbrian pipes, a Ceilidh etc. This year there is no obvious choice and the thought is that there might be sufficient talent in the membership to provide our own Cabaret!. - any offers, suggestions would be gratefully received.

Professional Development Programme

The Professional Development Programme has been the most successful ever and preparations are now starting for the 2004 Programme. If anyone would like to offer a course or can identify a gap in recent provision please let the Secretariat know by 1st November. We always aim for a mixture of courses that remain in demand such as grass identification with some new themes each year. The programme will be printed and available on the IEEM website. By the way there are still just a few vacancies on this years programme so check the website if you are interested.

The IEEM On Line Directory

Due to the efforts of Taylor Made Computing and Anna Thompson, the On Line Directory is now up and running. All members are urged to check the website and database for their entries. There are still quite a number of members who have not responded. Although there is no compulsion to be included, the more comprehensive the Directory, the more effective it will be. Over 400 members are now included in the commercial directory and nearly 800 in the password protected members section. Several members have reported extra business from the Commercial section whilst the members section has increased communication within the Institute. Any feedback and experiences - pleasant or otherwise would be appreciated.

Society for the Environment

The formal application for a Royal Charter was submitted to the Privy Council on 28th September - the culmination of a substantial amount of work by all concerned. Prior to submission there was an extensive range of consultation on the preliminary application with potential stakeholders to ensure that the purposes behind the proposal were fully understood and appreciated. The response generally appears to be supportive. The only substantial objection is understood to be from the Landscape Institute. There could be others which might de-rail the process - we shall have to see. All being well, the Privy Council should approve the application before the end of the year and the process of admitting members into the Society should start early in the New Year.

Charitable Status

Negotiations are currently in progress with the Charity Commission following the submission of our application. At the last AGM, a new Constitution was adopted part of the reason for which being to make clear to the Charity Commission what we actually do and to point out that the benefits of IEEM go well beyond those for the individual members and very much to Society at large. There may still need to be further changes to the Constitution to meet the requirements of the Charity Commission and if Council approves, these will be submitted either to the AGM at Buxton or some future occasion.

CPD

Don't forget to return your CPD forms for 2002-2003. The new forms for 2003-2004 will be sent out shortly. Remember you only have to demonstrate that you have met the requirements - which are not that onerous. A complete list may be of interest but is not vital. If you have lost your form, you can download one from our website.

Membership Renewals

It's that time of year again and quite a few members have already responded. Do please try to avoid the need for reminders to be sent out - there is so much to do at this time that reminders are a real diversion of resources.

Staff News

Executive Director, Jim Thompson recently attended the IUCN 5th World Parks Congress in Durban on behalf of the Institute. A full report of the conference is included elsewhere in this edition. IEEM has been a member of IUCN since 1992 and is regularly represented at meetings in the UK and Europe. The World Parks Congress is special in that it only happens every 10 or so years and is a key preview of progress on the worlds protected areas which are so vital in overall biodiversity conservation.

The IEEM Business Plan

Council and the F&GP Committee are currently working on a Business Plan to take the Institute forward for the next few years. Part of the purpose of the plan is to lay out how the Institute will continue to provide services to members. *It would be useful to know if there are any issues which Members feel the Institute should address as these may be able to be built into the plan.* The 10 year membership survey has been taken into account but we now have many new members and expectations may have changed.

Further services under review/development

Chartered Environmentalist through the Society for the Environment.
 Extension of information services
 Extension of student facilities
 Enhancement of membership overseas
 Further development of website and membership database facilities
 Influencing training provision and skills available for the market place
 Charitable Status
 Joint projects with other Institutes - e.g. Soc Env
 Subscription to a knowledge data base – available to members
 Development of further Geographic Sections and networking
 Extending the range of external consultations and circles of influence
 A full suite of the Professional Issues Series publications giving guidance on all aspects of operating in the wider commercial world.
 A possible ecological contract based on the JCLI contract
 Production of an Annual Report to include the accounts
 Production of further promotional material
 Attraction of sponsorship

Why not join the IEEM Fellows?

There are currently only 10 Fellows in the Institute and this proportion greatly underestimates the potential. To demonstrate your eligibility to be a Fellow you must have made an outstanding contribution to the practice of ecology and environmental management and many members will undoubtedly have done so. Applicants are asked to provide and expanded CV and to set out their personal achievements in one or more of the following areas of professional practice:

1. Research in ecological management of the environment
2. Establishing professional standards through developments in training, methods, environmental policies and legislation
3. Promotion of ecological professionalism among employers, organisations, companies and other institutes
4. Innovation through establishing new partnerships, leadership, techniques or awareness for ecological professionalism
5. The practice of ecological and environmental management and biodiversity conservation

You need to have your application form signed by three members one of which is asked to provide a testimonial and you are asked for a £20.00 processing fee. A small panel of current Fellows then looks at your application and if the panel is satisfied - that's all there is to it. Don't be modest! Consider applying to be a Fellow right away and contact the office for the necessary forms! If you have a colleague who you consider suitable, suggest that they apply as well.

News in Brief

Living battery

Rhodospirillum rubrum a bacterium found in the marine sediments of Virginia, USA is able to convert sugar into electricity in a highly efficient manner. Scientists believe that these bacteria could provide a battery, which produces economical electricity for remote places. It is capable of generating electricity while feeding on simple sugars such as glucose (the main form of sugar in the environment), fructose (found in fruits), sucrose (in sugar cane and beet) and xylose (a constituent of wood and straw). Although the process is highly efficient, it is slow. At the moment the amount of power produced could just about run a calculator. Nevertheless, the prototype battery ran for 25 days. With this principle could allow a cup of sugar to power a 60-watt light bulb for 17 hours. A bacterial battery could be used in environments where it is difficult or costly to charge batteries. For people living in poor, remote communities, it might be possible to adapt the process so that they can use farm waste to power batteries.

Local wildlife mops up £7 million Lottery cash

English Nature's Wildspace! grant scheme recently announced its latest and final awards of nearly £500,000 for Local Nature Reserves across England. This pushes the total Lottery money distributed to nearly £7 million. These grants include funding for a further seven Community Liaison Officers bringing the total number employed through Wildspace! to 90. The scheme uses National Lottery money from the New Opportunities Fund Green Spaces and Sustainable Communities Programme to improve and create Local Nature Reserves (LNRs) where they are needed most, helping local communities explore nature on their doorstep. 6 Regions in England benefit from the latest awards of between £35,000 and £177,000 for improving LNRs, educational projects and employing Community Liaison Officers.

English Nature's Chair, Sir Martin Doughty said: "It is a fantastic achievement for us to have distributed nearly £7 million in just 2 years to help to give many communities the opportunity to experience wildlife on their doorstep. We can now concentrate our efforts to make sure that these innovative and exciting projects achieve their full potential and reach as many people as they can."

Making Tracks for Mammal Survival

For the first time there is going to be a co-ordinated approach to regular surveying of all mammal species across the UK. 23 organisations with interests in wildlife are to join forces, and form the Tracking Mammals Partnership. This spearhead will provide a comprehensive nationwide assessment of increases or decreases in numbers and suggest where directed management or broader conservation measures are needed to assist the ongoing survival of our native mammal species.

In the last 100 years, many of our native mammals have felt the effects of habitat loss, change through agricultural intensification, persecution, and competition from non-native species. The Tracking Mammals Partnership intends to benefit from the experience of effective bird monitoring in the UK, gained over the last 30 years. Data on ongoing population changes of mammals will be collected through a programme of annual surveys, run by organisations in the Partnership, with the help of a nationwide network of volunteers. The information obtained will inform conservation and wildlife management decisions, be relevant and interesting to a wide range of groups and will be included in future Government assessments of the quality of life in the UK.

Dr Jessamy Battersby, has been assigned the post of coordinator for the partnership, and will liaise with all the organisations involved, developing standardised survey techniques, and improving the collection and collation of data. Dr Battersby said: "The aim of the Tracking Mammals Partnership is

to make good quality data accessible to a wide range of organisations and to assist the government in making informed decisions on mammal issues."

20th Century Domesday Book of the Welsh Landscape

Priority habitats of Wales is the culmination of more than twenty years of survey work by the Countryside Council for Wales. It provides a uniquely detailed record of a cross section of Wales' most vulnerable natural habitats, which are in need of conservation action. Twenty-seven terrestrial and freshwater priority habitats are listed as being in need of conservation work, under the UK Government's Biodiversity Action Plan initiative. Much of the information presented in the publication has, up until now, been largely inaccessible to the public.

Among the familiar Welsh habitats in the publication are upland oak woods, lowland heathland, species-rich hedgerows and coastal sand dunes. Tim Blackstock, CCW's Head of Natural Sciences said: "Although some of the habitats in the publication are still relatively common in the Welsh landscape, others are becoming increasingly rare and fragmented because of the way we have used and changed our natural environment."

"This information will help guide habitat restoration and re-creation projects that are developing as part of Local Biodiversity Action Plan initiatives throughout Wales. This is exactly the kind of data which is needed so that CCW, and our partners, can develop realistic yet challenging targets for habitat maintenance, restoration and re-creation," continued Tim Blackstock. Carwyn Jones, Minister for Environment, Planning and Rural Affairs launched the publication.

A Walking Sausage?

An insect belonging to an ancient group of invertebrates nicknamed the "Jurassic Insects" recently rediscovered 500 miles east of Australia has successfully hatched at Melbourne Zoo. An egg laid by a female Lord Howe Island Stick Insect, affectionately known as the "walking sausage" because it is fat as a thumb and has no wings, has hatched nearly seven months after it was laid. There is little known about this bizarre insect, which is believed to predate the demise of the dinosaurs. The species was rediscovered in 2001, 80 years after it was thought to have been eaten to extinction by rats which infested the island after they escaped from a ship that had run aground.

For centuries the *Dryococelus australis* had thrived on Lord Howe Island, 500 miles east of Australia in the Tasman Sea. An adult can grow up to 15cm long but was no match for the predatory villains that consumed them to the brink. In 2001, scientists discovered a tiny colony of walking sausages on Ball's Pyramid, about 23km (14 miles) off the coast of Lord Howe Island.

The zoo says it is now intending to reintroduce the insects to Lord Howe Island but only after it has eliminated the rats.

Obituary

Max Nicholson CB CVO 1904–2003

This pioneering conservationist who was instrumental in setting up English Nature died on 26 April, aged 98. Max Nicholson was Director-General of the Nature Conservancy Council (as it was then called) during its formative years, between 1952 until 1966, establishing the first nature reserves and helping to set up a network of legally protected wildlife sites – Sites of Special Scientific Interest (SSSIs). He also helped create the World Wildlife Fund in 1961. Max was a distinguished ornithologist. He wrote books on birds, conducted censuses, developed counting techniques and worked on bird ecology. In 1932 he created the British Trust for Ornithology and in 1938 helped found the Edward Grey Institute of Field Ornithology. In 2000, at 96, he drew attention to the decline of sparrows in south-east England, which led to a government grant for research. English Nature Chief Executive, Andy Brown said, "Max's achievements are truly remarkable. Virtually single-

handed he constructed the framework for nature conservation in this country, which has served us well for over 50 years."



A welcome return.

Lower pollution levels in rivers increased fish stocks and better management of the riverbanks has led to a resurgence in the number of otters found in and around England's rivers. The National Otter Survey for England, which was published in May this year shows that otters are once again found in areas of the country they have not been seen in for nearly 50 years. The Environment Agency and The Wildlife Trusts searched more than 3,300 riverbank and wetland sites during 2000-2002 for indications of the presence of otters. Of the sites surveyed nearly 35 per cent showed evidence of otters, up from just 5.8 per cent in 1977-79. In every one of England's 12 regions and river catchments the number of sample sites with signs of otters increased. However, the limited signs of recovery in some areas remain a concern. Alastair Driver, the Agency's National Conservation Manager, said: "We can't become complacent. Otters are not increasing as fast as we would like in some areas and we will need to concentrate on ways to protect the animals from the motor car - which continues to be one of the biggest threats to the otter."

Butterfly Conservation

Butterfly Conservation has released two new leaflets that are designed to aid in the conservation of these colourful insects. The first 'Brownfields for Butterflies' is an introductory leaflet to the value brown fields have for some of Britain's best-loved butterflies and moths. The second 'Butterflies in Towns and Cities' are guidelines for managing urban habitats for butterflies. Within this guidance note important areas for butterfly habitat are discussed including: grassland and scrub, trees and woodland hedgerows, road verges and field margins and damp grassland and wetlands. These booklets are available from The British Butterfly Conservation Society Ltd www.butterfly-conservation.org or Manor Yard, East Lulworth, Wareham, Dorset BH20 5QP.

Moorland Management

Scotland's Moorland Forum has produced a guidance booklet on the Principles of Moorland Management. The guide is aimed at encouraging the highest possible standards of management of the moorland areas of Scotland. Improved management is capable of providing enduring benefits for the landscape, for biodiversity for the rural economy and for local communities.

The guidance includes topics such as good management practice for a wide variety of moorland conservation management situations from Rotational muirburn, heather cutting, heather restoration and regeneration to sheep tick and deer management.

This guidance will be instrumental in fulfilling Scotland's international commitments to protect and improve the populations, species and habitats listed within the EC birds and Habitats Directives as well as securing the aims and objectives of the recently published draft Scottish Biodiversity action plan.



TECHNICAL DIRECTORS & PRINCIPAL CONSULTANTS

£30 – 50k plus benefits

RPS Ecoscope is a leading multidisciplinary environmental consultancy specialising in ecology and is part of the RPS Group plc, Europe's largest environmental consultancy, fully quoted as a FTSE 250 company on the London Stock Exchange. We are the largest employer of ecologists in the private sector with in the region of 40 full-time staff. We provide quality scientific solutions to the public and private sectors for the benefit of conservation, the environment and business. RPS Ecoscope is founded on providing quality ecological advice which we believe should play a pivotal role in the protection and enhancement of our environment. We have written a number of standard textbooks for the profession and we believe in striving to be the best in our field. The Company was recently honoured by a DTI Smart Award for excellence in technical innovation

We are now seeking to appoint Principal Consultants and Technical Directors to be based at a number of our offices in the UK. Successful candidates will be top-flight in their field and will play a major role in developing the Company's ecological work to increase market share and influence.

Principal Consultants would be expected to possess:

- 10 years experience of applying ecological principles to a range of projects, preferably within an environmental consultancy framework
- A substantial record of marketing environmental services
- The ability to actively seek and develop new areas of work
- A record of publishing technical material in an appropriate 'journal'
- Substantial experience of managing large, multidisciplinary projects
- Substantial experience of client liaison, contract negotiation
- Evidence of a reputation for excellence in his/her field
- Experience of public inquiry work, writing proofs of evidence, giving evidence, liaison with lawyers etc.

Technical Directors would, in addition to the above, be expected to possess:

- A strong record of senior management involving the management of senior and principal grades
- Demonstration of skills in personnel management and conflict resolution
- Substantial skills in and experience of contract negotiation
- Substantial skills in and experience of client representation with third parties
- A proven track record of innovation in ecology
- Demonstration of significant ecological understanding and its application in commerce, good publications record
- High level of corporate responsibility
- Excellent record of winning work, establishing teams, delivering contracts on time, on budget
- Understanding of financial management systems and corporate reporting

If you have what it takes and are serious about joining the Company, please send your CV and a sheet of A4 describing why you would like to be considered for these senior positions, to: Sue Stewart, RPS Ecoscope, Willow Mere House, Compass Point Business Park, Stocks Bridge Way, St Ives, Cambs. PE27 5JL. Email: stewarts@rpsplc.co.uk. Further company information can be obtained from www.ecoscope.co.uk and www.rpsplc.co.uk.

IEEM is pleased to welcome applications for membership from the following:

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 15th November 2003. Any communications will be handled discreetly. The decision on admission is usually taken by the Membership Admissions Committee under delegated authority from Council but may be taken directly by Council itself.

Full Membership

Mr Koru J. Alagoa, Mr Colin J. Barr, Mr Maxwell A.S. Carstairs, Mr Muk Kwai Cheng, Mr Kevin J. Cloud, Miss Debbie Court, Mr Richard M. Crompton, Ms Marie-Claire A. Edwards, Mr Gavin Forkan, Miss Susan E. Hogarth, Mr Simon T. Humphreys, Mr Adrian Knowles, Mr Patrick J. Lehain, Mr Derek Lord, Mr Patrick K. McKenna, Mr Joel E. Miller, Mrs Fiona T. Morris, Mr Marc Naura, Mr Peter A. Nicholson, Mrs Mary L. Norden, Mr Michael J. O'Kell, Ms Pernille V. Olsen, Dr Barry Shepherd, Dr Matthew J. Shepherd, Miss Alison E. Slade, Mr Freddie P.R. Symmons, Dr Barry C. Tranter, Miss Natalie Walker, Mr Stephen P.B. West, Mr James H. Williams.

Associate Membership

Mr Christopher J. Allen, Mr Vilas Anthwal, Mr Brian J. Armstrong, Mrs Susan Bartlett, Dr Jasmin A. Barwig, Mr Dominic S. Burton, Mr Simon F. Cahill, Miss Sarah Cane, Mr Alastair J. Chapman, Mrs Rupinder Dhillon-Downey, Mr Derek J. Gow, Mr Paul Hudson, Miss Lindsey J. Husband, Miss Caroline Irish, Miss Claire L. Jeeves, Mr Matthew J. Levan, Ms Cressida Mansfield, Miss Bethany G. Marshall, Miss Kay Marriott, Mr Simon A. Mason, Mr William G. Miles, Mr Michael T. Muir-Wright, Miss Lindsey A. Rendle, Miss Alison J. Riggs, Miss Victoria M. Rose, Mr Paul J. Scott, Miss Camilla H.G. Smith, Mr Edward Stocker, Miss Helen Swann, Miss Caroline J. Thorogood, Mr Valery Votrin, Mr Samuel Watson, Miss Harriet S.E. Webb, Miss Alisha E.S. Wouters.

New admissions to IEEM

IEEM is very pleased to welcome the following new Members:

Full Membership

Mr Richard S. Adams, Miss C. Louise Bebb, Mr Jonathan Brickland, Dr Kenneth Campbell, Mr Mark Clancy, Ms Rose Clarkson, Mr Michael Davies, Mr Tom Dearnley, Mr Robert A.C. Edmonds, Mr Jonathan P. Guest, Miss Rebecca J. Hall, Mr Matthew C. Jones, Miss Claire L. Leech, Mr Kevin R. Patrick, Mr Timothy F. Rafferty, Mr Peter Robson, Mr Richard Sands, Dr Iain Sime, Mrs Susan E. Steel, Mr Michael P. Thompson, Mr Johnny Turner, Dr Jackie Underhill, Dr John Underhill-Day, Dr Anthony T. Walentowicz, Mr David J. Weaver.

Associate Membership

Miss Nichollette C. Brown, Mr Benjamin D. Crabb, Miss Helen E. Dixon, Mr Abel Drewett, Miss Bonnie Eldridge, Miss Gemma S. Fenn, Mrs Katherine J. Hall, Miss Alexandre Harper, Miss Lindsey Howard, Miss Johanna Joensalo, Mr Jonathan P. Kendrew, Miss Gemma E. Lee, Mr Martin P. Macefield, Miss Colleen A. Mainstone, Mr Lee Mantle, Mrs Helen J. Markwell, Miss Clare H. Morris, Miss Crona O'Shea, Mr John Robinthwaite, Miss Kate Taylor, Miss Amy Thristan, Mr Jeremy Truscott, Mr Richard J. Walls, Dr Clair Williams.

Student Membership

Miss Suzanne Cooper, Mr McNeill Ferguson, Mrs Jacqueline A. Gilbert, Miss Vicki Howitt, Miss Gladys M. Nzuobontane, Miss Nenyelum W. Okonkwo, Mr Paul Richardson, Miss Lynne M. Roscrow, Miss Alexe E.D. Rose, Miss Marion H. Thomson.

Affiliate Membership

Rev. Martin Francis, Mr Paul A. Harmes, Miss Helen M. Proctor, Mr Jonathan G. Richards, Ms Judith Roberts.

The following have successfully upgraded their Membership from Associate to Full

Mr Mick Green, Mr Giles Groome, Miss Julie Tuck.

The Course programmes for 2003 for the Centre for Alternative Technology, Field Studies Council, Losehill Hall, Plas Tan-y-Bwlch and BTCV are all now available. Each offers a wide range of courses that might be of interest to IEEM members. Information from:

Centre for Alternative Technology: Further details about each course can be obtained from Joan Randle.
Tel: 01654 703743, Fax: 01654 703605, E-mail: joan@cateducation.demon.co.uk.

Field Studies Council: For a copy of the FSC Courses 2003 brochure, contact FSC head Office, Preston Montford, Montford Bridge, Shrewsbury, Shropshire, SY4 1HW. Tel: 01743 850 674, Fax: 01743 850 178, E-mail: fsc.headoffice@ukonline.co.uk.
website www.fieldstudiescouncil.org

Losehill Hall: Details from Losehill Hall, Peak District National Park Centre, Castleton, Hope Valley, Derbyshire S33 8WB
Tel: 01433 620373, Fax: 01433 620346, E-mail: training@losehill.u-net.com.

Plas Tan-y-Bwlch: Details from: Plas Tan-y-Bwlch, Maentwrog, Blaenau Ffestiniog, Gwynedd LL41 3YU.
Tel: 01766 590324, Fax: 01766 590274, E-mail: Plastanybwllch@compuserve.com.

21 – 23 October. Sustainable Energy/ Energy Efficiency and Environmental Solutions Expo. Olympia, London. Three shows under one roof provide unparalleled access to solutions for short, medium and long-term energy and environmental needs.
Details from www.sustainable-expo.info.

22 October. Making the Most of Green Roofs. St Ives, Cambridgeshire. Details from RPS Ecoscope Tel: 01480 466335 or e-mail: scoles@rpsplc.co.uk.

23 October. Why Move Genes around? Institute of Biology. Royal College of Surgeons, London. Case studies in the practical application of DNA science in medicine, forensics conservation and agriculture.
Details from Amy Scales 02075818333 ex 237 or their website www.iob.org

23 – 24 October. A two-day symposium on the use of long-term databases for the prediction of ecological change. The Linnean Society of London, Burlington House, London.
Details from john@linnean.org

28 – 29 October. Environment 2003 Panel Discussions, interactive workshops, multi media events and exhibitions. Novotel London West Hotel and Convention Centre, London.
Details from website www.environment-agency.gov.uk/conference or Tel: 01179 061339.

30 October. Using Aquatic Invertebrates as Indicators of Biological Water Quality. Buxton, Derbyshire. This short course will introduce the use of invertebrates as aquatic pollution indicators, demonstrate how samples are collected and processed, consider the health and safety issues associated with sample collection, and look at the commonly used systems for summarizing aquatic invertebrate data, such as BMWP, ASPT and LIFE scores.
Details from Nick Jackson at the IEEM office or from the website www.ieem.org.uk.

4 – 7 November. Scottish Natural Heritage Conference, Farming, Forestry and the Natural Heritage. Pitlochry, Perthshire. This conference aims to foster a better understanding amongst all key interests of possible ways to integrate landscape, biodiversity and recreational objectives in land management.
Details from Helen Forster 0131 446 2420 or email Helen.forster@snh.gov.uk or find information on their website www.snh.org.uk

19 November. North East Section Meeting - The Water Framework Directive. Dr Martyn Kelly. Northumberland Wildlife Trust, The Garden House, Jesmond, Newcastle. Details from the North East Section Convenor Steve Pullan, e-mail: steve.pullan@virgin.net.

19 November. Professional Practice: Managing a Contract. Stevenage, Hertfordshire. An introduction to the requirements and responsibilities of managing a contract. Worked examples of contract documents for habitat creation schemes will be used to demonstrate good practice, including guidance on contract administration from design to completion.
Details from Nick Jackson at the IEEM office or from the website www.ieem.org.uk.

20 November. Mitigation - Does it Measure up? CIWEM - SOAS, London. The aim of this conference is to understand the current status of mitigation practice in the UK highlighting both deficiencies and good practice.
Details from Bob Earl Tel: 01531 890415 or email bob.earl@coastms.co.uk

25 –27 November. IEEM's 18th Conference and AGM Upland Ecology, Tourism and Access. Buxton, Derbyshire.

This is a real opportunity to consider issues relating to the achievement of biodiversity levels, recreational use of the uplands, tourism and rights of access.
Details from Nick Jackson at the IEEM office or from the website www.ieem.org.uk.

2 – 5 December. Pollutec. Paris Nord Villepinte, France. Although water and waste will comprise the majority of the show, other themes featured such as risk management, coastal development and protection, noise, renewable energy and decontamination.
Details from Michele Jackson or Catherine Kimber, Promosalons UK 02082163108 or on their website www.pollutec.com

27 January 2004. Roads and Wildlife Workshop. Cardiff, Wales.
Details from Nick Jackson at the IEEM office.