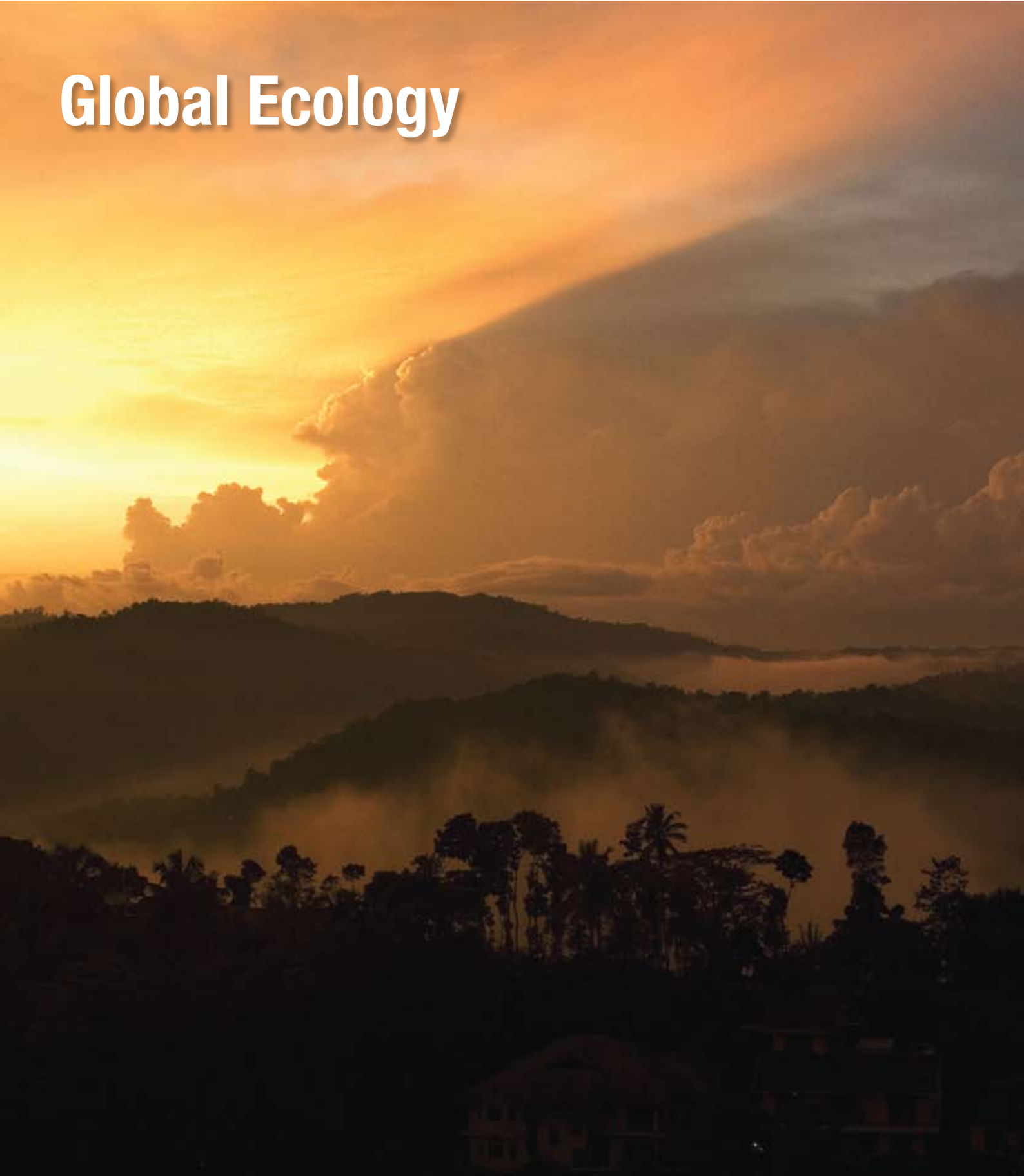




# In Practice

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## Global Ecology



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# Editorial

## *Quo vadis, Ecology? Or, back to the future?*

**In this 21st century, ecology should be central to national and international debates. Yet many ecologists lament that politicians don't listen to them, yet do, for example, listen to the hot air from the climate club.**

One of our problems as a profession is that it is less clear now than 50 years ago what ecology is, and how it relates to broader societal concerns. For the last 22 years we have had the concept of biodiversity, now solemnised into a UN Convention, and high up the political agenda of governments.

Or is it? I remember, at the 1990 IUCN World Congress in Perth, Western Australia, nearly choking on a prawn as my Minister at the time told me that they "really understood this biodiversity stuff now". The choking was due largely to a meeting held a week or so previously with senior biological and ecological figures where it was clear they didn't understand what biodiversity was about – and it seemed unlikely an Australian Minister would have the advantage on them (This is not however, an immutable law!!).

But recently a new idea has become widespread; ecosystem services. It's actually a very helpful concept and area, and it's even brought us closer to the other residents in our 'Big Brother *oikos*', as Robin Buxton pointed out in the last edition. But one consequence of closer working relationships is a blurring between biodiversity and ecosystem services. The EU study on *The Economics of Ecosystems and Biodiversity* (TEEB) shows this very clearly – it's supposed to be about biodiversity, but is largely about ecosystem services.

Of course they are connected, but our biggest challenge in the next 50 years is to show how ecology is a vital underpinning for understanding biodiversity, and at the same time, can provide insight into how ecosystems can function. And we need to grow up from narrow roots and realise that ecology is a global science that can be practised everywhere.

There is a new aspect of ecology called macroecology, which sounds useful, yet the journal dedicated to it is about as impenetrable as you can get. But the concept and idea is great – looking at large scale pattern. Understanding and explaining these patterns on the earth are just what we need to be able to make headway politically. Yet – isn't this what we used to call natural history? While I'm not advocating a return to ecological information being largely the province of men of the cloth, the idea that observation and monitoring are vital aspects of ecology needs to be reclaimed. And while modelling is really useful it must be informed by ecological sense and intuition.

The message I think is this: we need to be more proactive in taking ecological messages to the global community; to show how ecological thought and science can help the management of biodiversity at all its levels, and by working more closely with other disciplines really project the messages we think are important.

Then we will be listened to – sometimes, at least!!

*Peter Bridgewater CEnv FIEEM*  
*Chair, Joint Nature Conservation Committee*

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Cover image: Sundowner in the Hill Country, Dodanwella Ridge, Kandy, Sri Lanka

Photography: Geckoella Environmental Consultants pvt ltd

Artwork on the cover will normally illustrate an article in, or the theme of, the current issue. The Editor would be pleased to consider any such material from authors.

# Irrigation Development and Environmental Sustainability in Sri Lanka

Upali Senarath Imbulana

Additional Secretary (Irrigation and Technical Services), Ministry of Agricultural Development and Agrarian Services, Sri Lanka

## Introduction

**Sri Lanka is a country of considerable ecological importance and is rich in biodiversity. Internationally recognised ecosystems include four Man and Biosphere Reserves (e.g. Sinharaja Forest Reserve) and three Ramsar sites (including Bundala National Park and Maduganga). Wetlands are among the most important ecosystems. High population density, urbanisation, agricultural expansion and deforestation for timber are some of the threats to the sustainability of ecosystems.**

In Sri Lanka, agriculture accounts for approximately 28% of the land area, of which approximately 40% (740,000 ha) comprises paddy lands, with a further 560,000 ha classed as irrigated land. Paddy cultivation and irrigation are not just 'sectors' of the country's economy; they are components of its civilisation and economic development from ancient times.

Since 1950, the irrigated area has expanded rapidly; the irrigated paddy area was 47% of the total paddy lands in 1950 and the proportion increased to 75% by 2000. High investment in irrigated agriculture resulted in productivity increases that have made the country nearly self sufficient in rice, which is the staple food of the majority of Sri Lankans. About 80% of the domestic rice production comes from irrigated lands.

In recent times, the contribution of agriculture to Gross Domestic Product (GDP), particularly that of paddy, has decreased. In 2002, agriculture accounted for 20.5% of GDP, reducing to about 16.5% in 2006. The share of paddy correspondingly reduced from approximately 3% to 2% in the same period. However, about 32% of the people are still engaged in agriculture, and therefore, agriculture remains vital for rural livelihoods.

## Beneficial Impacts of Irrigation on the Environment

Irrigation development in Sri Lanka has enhanced the environmental resources used by communities. Studies carried out in the Mau Ara (a tributary of the River Walawe) Diversion Project area revealed positive impacts of irrigation development on groundwater. This project was designed to augment a series of small reservoirs ('village tanks') through the diversion of water from the Mau Ara. The village tanks are normally managed by the village community to obtain services such as drinking water, sanitation,

water for livestock and irrigation. A main source of water for the village tank is rain. The water stored in the tanks helps to recharge ground water, and irrigation water diversions therefore help to maintain higher water levels until July and August, which are the dry months, than would otherwise be the case.

The area developed by the Weli Oya (another tributary of the River Walawe) Diversion Scheme lies in the District of Moneragala (in south-east Sri Lanka), which is one of the least developed and poverty-affected districts of the country. The project diverted water from Weli Oya to the water scarce areas of Moneragala.

Ground water studies in the Weli Oya area showed that water quality is considerably better in shallow dug wells compared to deep tube wells. For example, nearly 62% of the shallow dug wells exhibited desirable levels of electrical conductivity (EC < 700 microsiemens per centimetre), while the corresponding percentage for deep tube wells was 36%. Another problem with groundwater in this area is the high fluoride concentration. It was found that 31% of the shallow dug wells contain fluoride concentrations at desirable levels, compared to only 6% of deep tube wells. As irrigation contributes to keeping groundwater levels high, it can be concluded that the supply of irrigation has contributed to environmental benefits including the provision of better quality drinking water and sanitation.

Irrigation reservoirs and facilities may also benefit wildlife and enhance biodiversity, by contributing wetland areas within areas that may otherwise constitute dry scrubland habitats. Paddy fields and tanks are sources of food for many birds, especially waterfowl including the pheasant-tailed jacana, purple swamphen, and a diverse range of egrets, bitterns and herons. There are frequently a number of tanks within an area,



**Intensive paddy cultivation, Sri Lanka**  
Photo: Geckoella environmental consultants pvt ltd

each representing a different successional stage.

## Adverse Impacts of Irrigation on Wetlands and Water Bodies

Bundala National Park is a coastal lagoon system located in the south-eastern dry zone and was the first Ramsar wetland site in Sri Lanka, designated in June 1990. It is famous for its migratory waders, although the resident avifauna is equally impressive and includes large numbers of spoonbill, spot-billed pelican and painted stork. However, recent irrigation development upstream of these lagoons has resulted in intensified agriculture, and the drainage water from newly developed agricultural lands has affected the water balance, nutrient status and ecology of these wetlands.

Research work by the International Water Management Institute (IWMI) found several impacts of this upstream irrigation development, especially affecting the Embilikala and Malala lagoons. One impact is the flow of agricultural drainage into the lagoon system resulting in a drop of salinity levels. Consequently, lagoon fish and shrimp populations have decreased. Another impact is caused by the loss of grazing land of livestock due to irrigation expansion. This has resulted in cattle straying into the park area, where a combination of increased cattle dung and urine with fertiliser from irrigation drainage, has caused eutrophication. In addition, the breaching of the sandbar by farmers to protect upstream paddy lands results in fluctuating water levels which affects wading birds and other wildlife dependent on food sources in the shallow mud flats of the lagoons. High phosphorus and nitrogen concentrations have also been noted in the Embilikala lagoon.

The resultant changes in lagoon ecology have contributed to the decline of species as well as changes to habitat diversity, and affects livelihoods such as fisheries and tourism. The economic and social impacts such as a reduction in ecotourism and fishing have been felt by local communities.

Many irrigation reservoirs in Sri Lanka are located in 'cascade' systems where the drainage from one irrigation scheme is recaptured in a scheme downstream. Though this increases the irrigation efficiency, if the drainage contains high levels of agro-chemicals, it ultimately contributes to poorer water quality of irrigation reservoirs. Studies show that several reservoirs in the Anuradhapura District and Mahaweli System H (both in the north-central province) have high nutrient levels. Similar observations are made in the up-country wet zone. Though there is not a comprehensive monitoring mechanism to cover the water bodies in the entire country, the available information suggests that nutrient pollution resulting from agriculture is

### CASE STUDY

#### The Uda Walawe Left Bank extension Project (UWLBP)

Karagan lagoon is located in the downstream edge of a small coastal watershed called Karagan Oyal adjacent to the Walawe river basin. It is an ecologically important wetland, and home to pelicans, flamingoes, ducks, shorebirds, gulls and terns. There are about 10 small village irrigation tanks (reservoirs) upstream of the lagoon, and their local areas are generally cultivated in the rainy season only. Therefore, agricultural drainage coming to the lagoon at present is having little effect. The lagoon is separated from the sea by roads and sand dunes.

This situation could change in the future. The UWLBP is located in Walawe basin, but the drainage water would flow to the watershed of Karagan lagoon. Based on the simulations carried out by IWMI, it is feared that irrigation drainage will change the characteristics of water and temporal pattern of water level fluctuations. With this background, the project authorities have arranged for a study to assess the impact of the new irrigation development on water quality and groundwater, including temporal patterns.

Increasing agricultural production and mitigating environmental degradation are among the objectives of the project. The study on water quality and water levels will perhaps pose new challenges to integrate these two objectives; however, efficient water management will remain a key factor.

The project has introduced interesting new water management techniques to address water wastage. For example, in long distribution canals, the irrigation managers often have to provide a continuous supply even during the night, to avoid the lag time for water to reach the tail end of the irrigation system after an interruption. However, during the night a certain amount of water is wasted. A solution adopted by the project is the use of night storage ponds, which receive water from the canal system and store it during the night. This reduces the lag time for water to reach the tail end. In addition, there are the 'low tanks', which, as a part of the village tank cascade system, control drainage outflow and improve water use efficiency.

Another water management problem faced in older schemes, which tried to promote the cultivation of field crops together with rice in the same area, was that one irrigation rotation schedule had to be applied to both crops. This resulted in over irrigation of field crops. The project promotes cultivation of field crops parallel to rice, and the traditional canal systems could have resulted in wastage of water. The solution adopted was the construction of 'dual canals', one serving the paddy area and the other serving field crops.

wide-spread in the agricultural areas. This is a serious issue because most of the irrigation reservoirs are used for the supply of drinking water and bathing.

## Recent Attempts to Mitigate Adverse Impacts

Legal, institutional and technical measures have been adopted to address the pollution of water bodies in the recent past. The National Environmental (Amendment) Act of 1988 included a provision that 'prescribed projects' should have an Environmental Impact Assessment (EIA) undertaken before being approved. The projects are prescribed in relation to their type, magnitude and location. For some projects, the EIA process can be very lengthy. For example, the Upper Kothmale hydropower project took about 20 years between being found feasible and its eventual implementation, due to environmental concerns. Several other recent projects, including many irrigation projects, have incorporated many measures to help mitigate environmental problems [see the Uda Walawe case study box].

## Development and Environmental Sustainability: The Critical Balance

The above examples show that legal measures and improved water management practices are having a positive impact on

*Wildlife-rich irrigation system in Walawe region with Asian openbill *Anastomus oscitans* and pheasant-tailed jacana *Hydrophasianus chirurgus**  
 Photo: Upali Senarath Imbulana



such irrigation projects are guided by development and management policies and strategies. Provisions for environmental sustainability are often inadequate in development policies. For example, irrigation authorities are not responsible for maintaining the water quality in Bundala lagoon system, and agencies responsible for conservation have inadequate staff and resources to enforce the regulations. In this situation the void created by the lack of a comprehensive policy for irrigation and water resources management is evident.

Experience from Sri Lanka shows that conservation policies and regulations alone are insufficient for sustainable development, or for sustaining the environment. The latter should be addressed by policies for development, and it should form an integral component of management strategies. If development is

the environment. However, the situation is not perfect. On the one hand, the maintenance of environmental quality is critical for sustainable development. But, on the other hand, a country facing energy and food problems cannot wait several years to implement a technically and economically feasible development project. It can also be seen that environmental degradation continues to some extent, despite the policy, legislative and water management measures.

Balancing the development with environmental sustainability is not a new experience for Sri Lanka. In 1997, Justice C G Weeramanthri, then Vice President of the International Court of Justice, in his separate opinion about the case concerning Gabsikovo-Nagymaros Project, cited the ancient irrigation-based civilisation of Sri Lanka as an example of reconciling the needs of development with protection of the environment. He noted that practices including erosion control tanks, and reservoirs for people and wildlife helped to minimise damage to the environment, and were backed by royal decrees and customary law.

How can there be significant environmental degradation due to development activities in a country where sustainable development had been a tradition?

Fragmentation of responsibilities among a large number of water sector institutions and inadequate coordination make addressing water pollution problems difficult. Another concern is the inadequacy of monitoring mechanisms. In 2005, the United Nations Environment Programme identified that the excessive use of fertiliser in agriculture, and the resulting agricultural drainage is one of the main pollutants of water bodies in Sri Lanka. However, such impacts are only identified when the water body is already polluted, and monitoring mechanisms are currently inadequate to detect the point source of pollutants; the quality or quantity of drainage from irrigation projects is rarely measured.

The policy gaps in the water sector are very obvious. Environmental policy provides for the protection of wetlands, and environmental regulations provide for adopting mitigation measures to address likely environmental problems at the initiation of a development project. However, the managers of

meant to better human life, then adverse impacts on human health and livelihoods due to environmental degradation are unacceptable.

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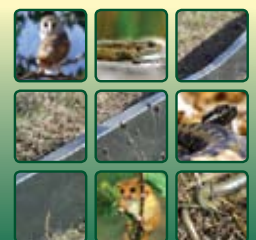
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# Environmental Assessments in Sri Lanka - Points to Ponder

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## Introduction

**In Sri Lanka, Environmental Assessments (EA) are carried out for various projects as a legal requirement under the National Environmental Act 1980 (as amended) for the Central Environmental Authority (CEA), and also as institutional and regulatory requirements of the organisations of donor countries, e.g. Asian Development Bank (ADB), World Bank, United States Agency for International Development (USAID), etc. Therefore, the studies termed as Environmental Assessments fall within a broader category encompassing: Environmental Impact Assessment (EIA); Initial Environmental Examination (IEE); Strategic Environmental Assessment (SEA); and Preliminary Information (PI) which may later be converted to an IEE, etc.**

Interestingly, many organisations have very comprehensive guidelines and literature as to how an EA should be carried out. Although these guidelines are available, environmental consultants who undertake these EAs in Sri Lanka are confronted with several practical difficulties; this paper aims to shed some light on the grey areas and certain hurdles faced by those consultants.

## The EIA Process in Sri Lanka in Brief – The *Modus Operandi*

The EIA is a requirement stipulated under the National Environmental Act 1980 (as amended). The EIA process applies only to 'Prescribed Projects' specified by the Minister related to the subject of Environment. Prescribed projects are implemented through Government channels. The EIA process may be summarised in four stages:

1. Terms of Reference (TOR) for the EIA are issued in concurrence with the CEA. The project proponent appoints a consultant who will carry out the project according to the TOR;
2. an EIA is produced and analysed by a Technical Evaluation Committee (TEC), appointed by the Government;
3. the EIA is then subject to further scrutiny, including relevant Government departments, and (on rare occasions based on the severity of the impacts), public comment; and
4. the EIA report is then republished taking into consideration the comments made, and the project receives approval by the CEA.

## Terms of Reference

Generally when an EA has to be carried out for a certain project the relevant regulatory agency issues a TOR. However,

experience has demonstrated that TORs may not always adequately cover the proper requirements of the study, contain omissions and inconsistencies, or not be logically structured. A TOR should be prepared by suitably qualified experts (who understand the project), involve input from representatives of other relevant organisations, and not copied from a 'stereotype model TOR' of a similar project with minor alterations made.

Typically, a multidisciplinary team of experts undertakes an EA. Therefore, the TOR should also be developed by a similar team of experts, as it invariably sets the Table of Contents for the EIA report that follows.

## Independence of the EA Consultant

Although the EA consultant should act independently, it is sometimes difficult to ensure this independence, as within the Sri Lankan system, the EA consultant is typically appointed and paid by the project proponent.

Possible options to assist clarification of this independence, and to make the process 'transparent', may be for EA consultants to be accorded a legal independent status to carry out their functions and for their remunerations to be made through the CEA.

## Feasibility Study Reports/Detailed Design Reports

Usually, to prepare the TOR there should be a project document, and it should be at least a pre-feasibility study. Ideally, the EA is conducted at an early stage, where there is ample opportunity for feedback and modifications to the project design to address environmental issues. The design can then be finalised to mitigate project impacts.

Unfortunately, in some cases TORs are issued without sufficient background documentation, and the TOR does not address the specific issues of the project. It has been known for the EA and feasibility studies to have been undertaken concurrently.

In some instances EAs are carried out after the conclusion of detailed designs and Project proponents may attempt to treat the EIA requirement as a regulatory hurdle to be overcome rather than a process whereby a more environmentally sustainable project is made possible. Mitigation design may then pose difficulties for the consultants, because it is always more difficult to change something that has apparently been 'finalised'. Consequently, detailed designs are sometimes completed without environmental concerns being properly addressed. Therefore, TORs should only be issued for an EA if there is at least a pre-feasibility study report.

It is now the practice of the CEA to request a detailed project report as well as a feasibility report for large-scale projects. The emphasis is thereby placed upon the project proponents to carry out the required feasibility studies prior to embarking on the EIA study. It should be stressed that the project proponent should initiate the EIA process at the correct time, which is after

the feasibility studies and before the detailed design stage. A pre-feasibility should be a mandatory requirement prior to TOR development. Site visits and scoping reports by the team developing the TOR could be looked at as well.

Detailed project design should be finalised only after the EIA (incorporating an Extended Cost Benefit Analysis to further buttress the environmental feasibility of the project) is produced. In this way the designs can properly address minimising any adverse impacts identified through the EIA process. It is also suggested that the CEA could scrutinise the detailed designs before granting the 'green light' to the project.

## Local and Foreign Agencies - Regulatory Requirements

Any EA is subject to many regulatory requirements. Even if the project is in Sri Lanka but the funding agency is foreign, then the EA is subject to certain regulatory requirements of that country. For example, for the projects funded by US regulation, different regulations apply. For ADB and World Bank projects the respective guidelines based on project categories apply. These regulatory requirements may be more stringent than the local ones.

Within Sri Lanka itself, the 'on-the-ground' situation may be complex. For example, the embankment level and the culvert sizes of a road in a low-lying area designed by the Road Development Authority (RDA) may have to satisfy the requirements of Sri Lanka Land Reclamation and Development Corporation (SLLRDC). Conversely, a culvert/bridge designed by SLLRDC for a drainage project which is across an RDA road has to obtain the RDA's approval for its structural design, loading limits, strength, etc.

To help clarify the position at an early stage, it is suggested that all the relevant agencies, and their specific responsibilities and jurisdiction for a particular project, could be identified and listed within the TOR.

## Agency Goals, Interests, Resources and Environmental Know-how

In Sri Lanka, when fulfilling the regulatory requirements mentioned above the environmental consultants often need to deal with various local agencies who do not operate as environmental regulators, but owing to provisions within various acts the approvals of these agencies are necessary.

Generally most of these agencies have various other functions, and when there is an EA for the project although they are bound to give the approval after imposing conditions, their task may be delayed owing to lack of resources or unfamiliarity with EA procedures, regulations, law, etc.

Many organisations may not have a proper environmental policy. Although, they will carry out regulatory functions mostly free of charge, in some cases verification will require independent technical studies (e.g. hydraulic model studies for a run of the river hydrological project) where additional time and resources are involved. Adequate help in the form of funding or training should be provided to these regulatory organisations to assist their active and informed participation.

## Technical Evaluation

Often within Sri Lanka, EA consultants have to face a technical evaluation. For local projects under the jurisdiction of the CEA, a Technical Evaluation Committee (TEC) of multidisciplinary experts is normally appointed. The EA team is required to answer the comments raised by the TEC and make any

necessary corrections to the EA report.

To avoid the possible waste of time and resources, the consultant should liaise with the TEC at an early stage as to how they may evaluate the EA. An

intermittent evaluation just after the main findings are prepared by the consultant is also proposed as a very valuable step to help generate a realistic EA.

## Environmental Monitoring and Management of Impact Mitigation

In the EA, various environmental monitoring and management activities are specified, but unfortunately few of these will actually be implemented during construction. One difficulty is the absence of 'quick check' parameters (such as noise, water quality, air quality, etc.), and also within Sri Lanka there are relatively few accredited laboratory facilities which could reliably undertake monitoring programmes. It is worth considering the establishment of a much simpler procedure where for example, an appointed CEA officer could carry out any required day-to-day monitoring thereby avoiding the need to go through an accredited laboratory.

In the case of construction projects, most of the management activities are in-built in the construction programmes and contract stipulations. Now, in new Contract Documentation there is a section called 'Conditions of Particular Application' (CPA) which states all the measures that the Contractor should implement to mitigate the environmental impacts.

However, previous or existing contract documents gave mitigation a relatively 'bleak' or nebulous focus, and the contractor cannot directly be forced to carry out specific mitigatory measures. It is suggested that further training is provided for personnel who are involved in contract writing so that they can ensure that practical and relevant clauses relating to environmental impact mitigation and management are incorporated into contract documents. These aspects are still in the formative stages, and require further development.

## Towards a New Epoch

Many of the points discussed in this paper may appear to be unduly negative, but there are also encouraging and positive signs to highlight. In particular, in spite of the drawbacks, satisfactory progress is currently being made where various parties attempt to conduct quality EA studies. There are also training programmes, seminars, workshops, NGO activities, public interest litigation and adverse newspaper articles, all of which are positive contributory factors.

In addition, many organisations have established separate environmental divisions, and have appointed separate officers who can promote good environmental practice and approaches amongst their peers. The CEA have a crucial and 'leading light' role to play as we all work towards achieving a better environmental future in Sri Lanka.

This article first appeared in the *Journal of the Sri Lanka Institute of Environmental Professionals*.

**Sri Lanka coast near Galle**  
**Photo: Geckoella**  
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# Aspects of Environmental Management in the Construction of the Southern Highway

*Dithya Kumara Angammana  
Environmental Specialist, Sri Lanka*

## Introduction

**The concept of the Southern Highway was introduced by the Road Development Authority (RDA) and the Ministry of Highways in the late 1980s as a part of the network of new highways proposed to cater to the increasing transport demand of the country. The purpose of the Highway is to link the capital, Colombo, with the Southern Province, promoting, among other things, a wider geographical distribution of economic growth in Sri Lanka. The Highway is currently under construction.**

## Location/General Layout

The Highway has been designed as a dual carriageway, 126 km long. It is located in the Southern part of Sri Lanka in a corridor from Colombo to Matara, lying approximately 5–11 km inland from an existing coastal main road and railway. The Highway traverses through four districts, and includes 18 Divisional Secretariats. It also crosses four major rivers in the south western and southern regions of Sri Lanka: the Kalu Ganga, Bentara Ganga, Gin Ganga and Polwatta Ganga.

The acquisition width for road construction was 80 m and the road platform is designed for a four lane highway, with provision for expansion to six lanes at a future date without any further acquisitions. Along the highway there will be 11 interchanges, and numerous under- or overpasses for minor roads to cross the Highway.

## Management Structure for the Project

The Highway is being developed

under the auspices of The Ministry of Highways/Road Development Authority (RDA) and the Ministry of Transport. Funding has been provided by the Japan Bank for International Cooperation (JBIC) and the Asian Development Bank (ADB).

Pacific Consultants International (PCI) and Japan Bridge and Structure Institute (JBSI) in association with Resources Development Consultants Ltd (RDC) act as the supervisory consultant for the JBIC funded section, while Halcrow Group Ltd provides supervision for the ADB funded section. Finnroad Ltd, in association with Surath Wickremasinghe Associates, acts as the Management Consultants for the project.

## Environmental Management and the Southern Highway

The main objective of environmental management is to identify negative impacts of the project, and minimise those impacts through appropriate mitigatory measures, while attempting to enhance the quality of the environment. Environmental management should also ensure efficient and effective implementation of the mitigatory measures without causing any damage to the living environment, including people living in the vicinity.

The project is considered a 'prescribed project' according to the National Environmental Act 1980 (as amended), and it was mandatory to conduct an Environmental Impact Assessment (EIA) prior to starting of the project. Since the RDA was the client for this project, the task of conducting the EIA was passed to the University of Moratuwa. The EIA was prepared in accordance with the TOR given by the Central Environment Agency (CEA), and was submitted to them in March 1999. Social assessment studies were carried out by the University of Colombo.

An Environmental Management Plan (EMP) was prepared, informed by the EIA and related documents. The main

purpose of the EMP is to provide a framework to minimise the adverse environmental impacts of the project in all its phases. It defines the key stakeholders, and reporting and feedback mechanisms. The EMP also provides the basis for, (a) a systematic collection of data to determine the actual environmental effects of the project, (b) compliance with the regulatory standards, and (c) measures the success of the environmental protection activities identified during the EIA process.

Environmental management within the Southern Highway project is a contractual obligation, and is undertaken by a multi-disciplinary team drawn from the key partner consultants, government agencies and sponsors. The contractor, who is responsible for the implementation of the EMP, has to submit a monthly monitoring report, covering all aspects of mitigation measures taken, to the consultant. The consultant in turn scrutinises the report and submits it with comments to the sponsoring agencies and key partners.

## What Happens on the Ground

The Highway traverses through an undulating and diverse terrain that includes wetlands (mainly abandoned paddy lands), rubber plantations and some private gardens.

The main ground construction activities include site clearing, earth works, (excavation, embankments and other areas of fill, areas of soft ground treatment, top soiling), drainage (reinforced concrete pipe culverts, slope protection, drainage structures), road works (sub-base, aggregate base course, prime coat and tack coat, pavement, guardrail, fencing, etc.), and structures (bridges, under- and overpass bridges, vehicular and pedestrian box culverts).

Impacts on the environment resulting from these activities depend on their magnitude and type, as listed in Table 1.

The impacts of development can also directly affect areas outside the works corridor. For example, although every effort is made to balance excavation and fill, additional excavation and/or deposition of hard core and/or topsoil is required. Extra licenses are required from Government agencies including the CEA in these instances.

### Example of Effects - Hydrology

Hydrology is a key concern for the Highway project, since the route passes through the 'Wet Zone' of Sri Lanka, including wetland areas. Vulnerable locations were located by the University of Maratuwa as part of the EIA process. Where the route crosses wetland areas, practical techniques to facilitate the movement of water, for example through perforated band drains, are employed.

Baseline data on water quality and ground water levels were collected. For water quality a total of 17 locations have been selected, including 16 surface water bodies and a well. Concerning the impact on ground water level, 24 wells located close to the Highway route were identified. Water quality is tested

every six months to cover wet and dry seasons. Water levels of the selected wells are monitored monthly. In addition, water quality tests are carried out in response to specific complaints by the public.

### Example of Effects - Communities

In many places along the route, communities live in close proximity to the works. Despite considerable efforts to minimize the amount of land acquisition, in the first section of the Highway (which is funded by the JBIC, and extends for 35 km) 951 hectares of land have been obtained. A total of 1,488 structures of all kinds have been affected. Of these there are approximately 1,315 homesteads, 151 commercial establishments and 22 other buildings. An estimated 20,340 persons have been affected both directly and indirectly by the project. People who have been directly affected, for example by landtake, have been compensated and in some cases resettled in selected areas.

For other nearby communities a systematic approach is being

implemented, informed by the EIA. A priority is the provision of a system for public representations. Complaints may be received via Government agencies, sponsoring organisations or directly by the contractor. Whatever the channel, the complaint is recorded and the contractor is informed. Monthly meetings involving key partners are also held to resolve issues raised. The public also has further redress to make representations to regional government.

In summary, there are numerous mechanisms, procedures and systems available to the project to address environmental issues relating to the Southern Highway, and these were heavily informed by the EIA. However, several matters may remain unresolved or take a long time to resolve, due to various constraints. Every possible effort is being taken by the main partners in this project to minimise adverse environmental impacts, and reduce and address effects on communities.

This article first appeared in the *Journal of the Sri Lanka Institute of Environmental Professionals*.

**Table 1. Direct and Indirect Effects of Construction of the Southern Highway, Sri Lanka**

	Direct Effects	Indirect Effects
1	Site clearing	Soil erosion, debris accumulation, dust emission
2	Pilot road construction	Disturbance to drainage, dust emission, soil erosion, siltation
3	Removal of topsoil	Soil erosion, dust emission
4	Embankment filling/soil compaction	Soil erosion, siltation, ground vibration, dust emission, disturbance to drainage
5	Soil excavation/deep cuts	Impact on ground water, soil erosion, slope failures
6	Rock excavations/blasting	Ground vibration, Air Blast Over Pressure (ABOP), noise, dust emission, flying rocks
7	Disposal of unsuitable material	Disturbance to adjoining lands, ground water contamination
8	Transportation	Dust emission, damage to public roads
9	Quarry and crusher plant operation	ABOP, noise, dust emission
10	Pile driving	Ground vibration

### Editorial Comment

IEEM would like to thank Andy King and Kate Jeffreys CEnv MIEEM of Geckoella Environmental Consultants pvt ltd ([www.geckoella.com](http://www.geckoella.com), [geckoella@gmail.com](mailto:geckoella@gmail.com)) and Senaka Samarasinghe, Development Officer, Institute of Environmental Professionals - Sri Lanka ([senaka@cea.lk](mailto:senaka@cea.lk)) for all their help in bringing together the contributions from Sri Lanka.

IEEM and the Institute of Environmental Professionals - Sri Lanka (IEP-SL) recently agreed on a Memorandum of Understanding. From this it is hoped that benefits will be gained for both professional bodies through working closely together on matters of common understanding in the environmental field.

For further information please visit IEEM's *Partnerships* webpage ([www.ieem.net/partnerships.asp](http://www.ieem.net/partnerships.asp)).



# The Environment Institute of Australia and New Zealand Ecology Group

Simon Mustoe MIEEM

Director, AES Applied Ecology Solutions Pty Ltd, and Convenor, EIANZ Ecology Group

**T**he Environment Institute of Australia and New Zealand (EIANZ)<sup>1</sup> is the region's professional association for environmental practitioners. The Australian chapter was formed in 1987 as the Environment Institute of Australia (EIA), representing each of the eight states and territories as a different division. It was reconstituted in 2002 to incorporate a New Zealand chapter, hence EIANZ.

The Institute has always had a strong focus on ecology but only about 20% of members are ecologists. In late 2007, a like-minded group of concerned professionals came together to discuss the merits of creating a nationally-focused organisation and decided EIANZ was the vehicle of choice. Bringing more ecologists under EIANZ's framework would not only provide better representation but start to address fears of poor/inconsistent standards that are affecting the ecological industry's image, particularly in the private consulting sector.

By mid-April 2008, EIANZ Ecology<sup>2</sup> was formally approved by EIANZ as a Special Interest Section (SIS), the second of two SISs, the other being on Environmental Impact Assessment. At the same time, the Certified Environmental Practitioner programme<sup>3</sup> was well underway and the committee was considering how to focus the programme on specialist skills, looking to these two SISs for assistance.

EIANZ's chairman, Bill Haylock said at the Institute's Environmental Professional *The Third Wave in Environmental Practice* event that 'there are millions of "so-called" experts, however there are only 20,000 or so environmental practitioners, there are even less who have signed a code of ethics (about 2,000), and only a couple of hundred who are certified to practice'. There are even fewer ecologists!

There are some considerable challenges to start a group with representation in two countries, or for that matter, doing it in a Federation like Australia. Let alone the differences between

Australian and New Zealand, within Australia, consultants practice under numerous pieces of legislation, each differing markedly between states and territories. Species and habitat communities vary between areas. In some Australian states, animal welfare licences are required to operate and in other states not. There are different processes for ecological assessment, different threatened species lists, some states have public tribunals, others

have none. Above all this, Australia also has Commonwealth legislation. In 1999, the Environment Protection and Biodiversity Conservation Act 1999 (Cth) was enacted. This legislation is designed to meet national priorities under international law and is separate to, and over-rides state interests, for Matters of National Environmental Significance.

The differences have resulted in a very parochial attitude to ecology in practice. Many consultants have become used to working with their own regional policy, not knowing that better alternative approaches may exist in other states or even overseas. Whilst energy may be expended discussing matters within states or countries, there is little or no cross-boundary communication or standard-setting within the industry at a national/international level.

Two of the inaugural committee for EIANZ Ecology have been integrally involved with IEEM in the past, and several of the current committee



**Billabong, Far North Queensland, Australia.**  
Billabongs like these are common in the wet tropics but drought and unsustainable abstraction of water for agriculture and urban development are threatening most of Australia's important wetlands.  
Photo: Simon Mustoe

**Montane wetlands, shrublands and forests in Nelson, South Island, New Zealand.**

Photo: Judith Roper-Lindsay



are members. Those of us with experience of working in the UK in the early days before IEEM, see strong parallels between ecological consulting there at that time, and many of the problems with professional practice in Australia and New Zealand today.

There are few, if any, policies on the use of ecology under planning constraint, so good quality work goes unnoticed. For the smaller specialist companies, competition in Australia is presently very harsh, with 100% employment and many graduates being recruited to the rich Western Australia mining sector, with big companies offering starting salaries in excess of most small company directors. Because hardly any University courses teach this style of ecology, there is the usual lack of emerging expertise and a growing gap between supply and demand of skilled practitioners.

The urge to improve standards and empower specialist ecological consultancies for the betterment of the environment was a driving force behind the development of IEEM in the



*Compared to the Queensland rainforests, there is relatively little formal protection for dry forests in the tropical lowlands. This site is home to Buff-breasted Buttonquail, one of the least known and rarely seen Australian birds. Efforts to conserve it are thwarted by a complete lack of knowledge and lack of research.*

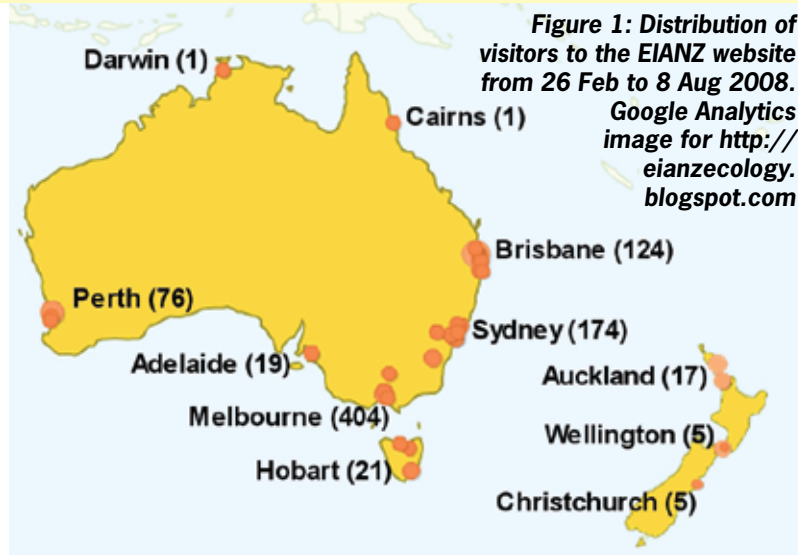
*Photo: Simon Mustoe*

early days. So too, this is the case for EIANZ Ecology. Whilst Australian and New Zealand government policy sets objectives for ecologically sustainable outcomes, basically poor standards of scientific approach are a constraint and rightly blamed for many poor planning decisions. Nevertheless, as Charles Meredith, Director of Biosis in Melbourne says that even consultants complain about the outcomes and ask 'when will some government department set some

standards?', rather than setting some themselves.

At its first meeting in April 2008, EIANZ Ecology concluded that:

1. Although the legal system can respond, uphold and shape standards, it cannot be expected to decide what standards are for other industries, especially as they can evolve quickly and often apply to very specific matters.
2. In other professions, standards of best practice are often developed by the members. There is often the naïve view that the development of standards fall to the government or courts but those are not always in the interest of professionals or the environment. Standards are



better set by the profession as a whole and, in the absence of other suitable guidelines, recognised professional standards are given great weight by the legal profession.

3. Membership of professional organisations, professional certification and continued professional development are important ways to progress the profession and recognise its role in long-term environmental management and ecologically sustainable development.

The problems may appear obvious but are difficult for EIANZ Ecology to address due to geographical constraints. Australia has a population about twice that of London, New Zealand about equal to London. IEEM's membership is about 3,600 (0.006% of the UK population). In Australia and New Zealand, this would be 1,275 and 263 respectively but membership is not divided equally and the principal cities of different regions are separated by vast distances (for example, it takes about two days to drive from Melbourne to Brisbane).

Figure 1 shows the distribution of users of the EIANZ Ecology website since its launch on 26 February 2008. This roughly equates to the distribution of EIANZ members and shows that there is an extremely small (or non-existent) contingent above a line between Perth and Brisbane and in much of South Island, New Zealand.

The vast majority of interest in EIANZ is from the eastern states of Australia, where there is a long history of relatively strong planning legislation and major urban centres. However, most mining and farming is in remote areas with no resident ecological consultancies and few members of the public are aware of legal requirements, if such requirements even exist. Many remote mining leases are governed by legislation that pre-dates the first proper Australian environmental planning law by almost 20 years, providing exemption for activities today. This has recently placed Australia under some scrutiny by the OECD<sup>4</sup>. A current senate inquiry into the Federal legislation



**Heaphy River, West Coast, South Island, New Zealand.**  
 Photo: Judith Roper-Lindsay

is looking at this and various other reasons why internationally threatened species are continuing to decline<sup>5</sup>.

So, like many other areas of the world, lack of legislative rigour and enforcement can be partially blamed for poor standards in ecological consultancy. If there is no accountability for outcomes, then there is little impetus to raise standards and there is not much scope for supporting an ecological profession. Those who attended the EIANZ Ecology forum in April 2008 agreed that greater accountability for ecologists within the profession would be welcomed – this would at least enable *bona fide* consultants to promote good work without the fear of losing contracts for appearing to be too 'green'. Accountability can be influenced both outside the industry and within it, by having more peer-driven systems to recognise good and poor quality work.

Additionally, consultants don't often get the chance to meet and discuss these kinds of matters. When they do, they have been traditionally bad at communicating the results more widely. There are however a number of active groups that are working very hard within their own regions, such as the Ecological Consultants Association New South Wales (ECANSW)<sup>6</sup>.

A principle aim of EIANZ Ecology is to recognise these interests and find ways to get ecologists communicating and working together via the internet to provide a more national (and international) focus and pool expertise and experience. The internet may prove to be the most powerful medium, particularly with the advent of video and audio podcasts, plus the ease with which written information can be relayed around the world. There is, however, some way to go to convince many to embrace the awesome capability of the internet to network professionals, though this will improve over time as a new generation of more internet-savvy ecologists appear. The process of discussing how these things can be done will begin at the EIANZ National Conference in Melbourne in October 2008.

The basic challenge in the early phases of EIANZ Ecology is to convince potential members of the environmental and professional benefits of working together, to produce their own policy on professional standards. Because of the range of jurisdictions, we need to ensure that the initial material is both meaningful and applies irrespective of regional differences. There also needs to be better recognition,



**Coastal nikau palms, West Coast, South Island, New Zealand.**  
Photo: Judith Roper-Lindsay

within and outside the profession, of the value of specialist skills and ethical behaviour. Ultimately this would make the job for developers, decision-makers and consultants easier and less demanding financially, as well as addressing some of the ongoing environmental degradation problems.

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<sup>1</sup> EIANZ (<http://www.eianz.org>)

<sup>2</sup> EIANZ Ecology (<http://eianzecology.blogspot.com>)

<sup>3</sup> Certified Environmental Practitioner (<http://www.cenvp.org>)

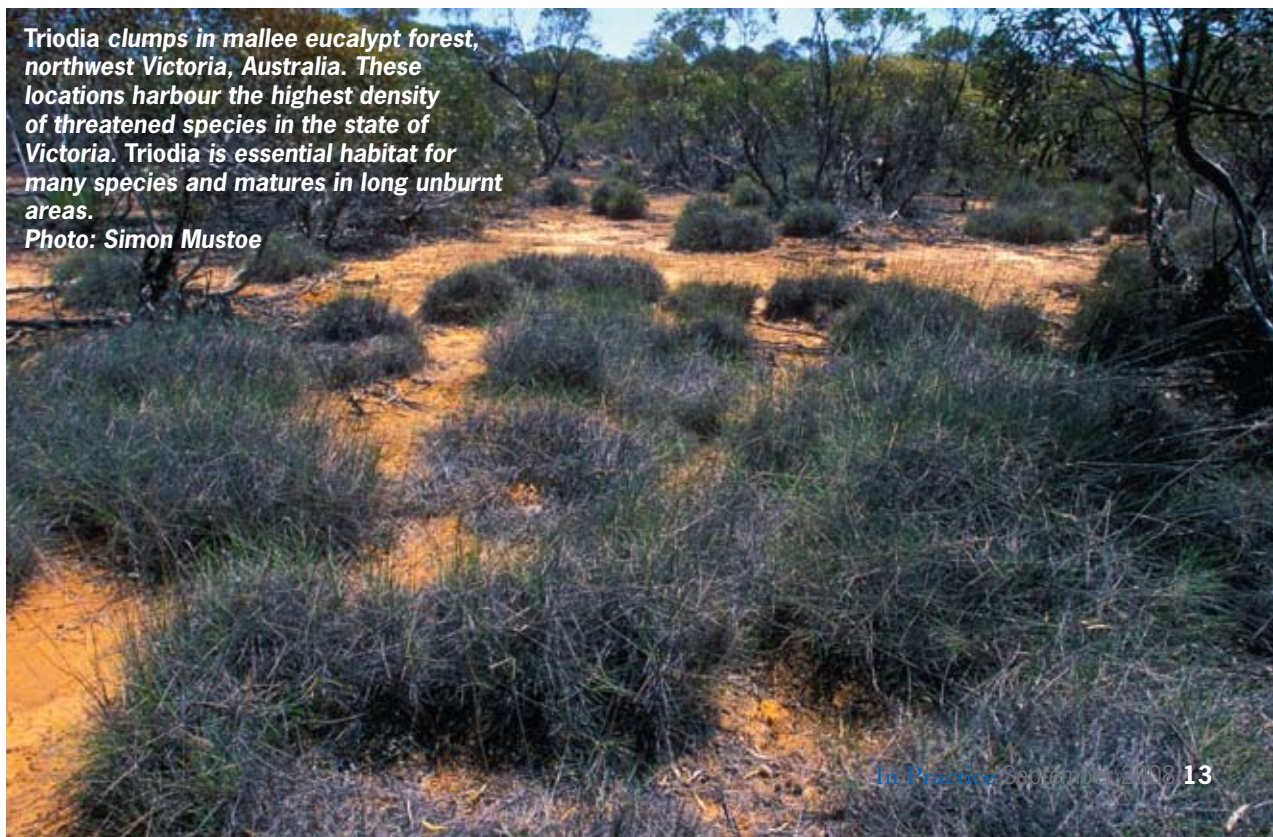
<sup>4</sup> OECD (2007) OECD Environmental Performance Reviews: Australia

<sup>5</sup> Parliament of Australia Senate ([http://www.aph.gov.au/Senate/committee/eca\\_ctte/epbc\\_act/tor.htm](http://www.aph.gov.au/Senate/committee/eca_ctte/epbc_act/tor.htm))

<sup>6</sup> Ecological Consultants Association New South Wales (<http://www.ecansw.org.au>)

**Triodia clumps in mallee eucalypt forest, northwest Victoria, Australia. These locations harbour the highest density of threatened species in the state of Victoria. Triodia is essential habitat for many species and matures in long unburnt areas.**

Photo: Simon Mustoe



# An Innovative Transport System for the Firth of Forth, Scotland

Gayle Pearson Boyle CEnv MIEEM  
Principal Ecologist, AMEC Earth and Environmental (UK) Ltd, Edinburgh

**I**n order to ease traffic congestion within Scotland's capital, Stagecoach plc has been developing a proposal for a passenger hovercraft service between Fife and Edinburgh. Extensive ecological assessment work has been undertaken to allow permission for two trials to take place within a highly sensitive site for birds and the outcome has been favourable, with permissions now being sought for a permanent service. It is anticipated that the benefits towards reductions in greenhouse gas emissions and carbon footprints will be measurable and assist towards current proposals contained within Scotland's Climate Change Bill and National Transport Strategy.

## Scotland's National Transport Strategy

One of the key challenges set out in 2006 by the Scottish Executive (now Scottish Government) was 'to develop Scotland's transport infrastructure and services in innovative ways that anticipate future needs and challenges, while recognising at the outset there is a carbon imprint to transport spending' (Scottish Executive 2006).

The City of Edinburgh has a well



Photograph 1: BHT-130 130 passenger craft beside the Firth of Forth Bridges  
Photo: Gayle Pearson Boyle

documented, widely discussed and troubled transportation system. Many readers will be familiar with the corrosion and structural issues associated with the existing Forth Road Bridge and the proposals currently being drawn up for a replacement. Other local strategic transportation projects include the Edinburgh Trams, Upper Forth Crossing at Kincardine, the Waverley Rail Line, the recently shelved Edinburgh Airport Rail Link and the on-going Local Authority plans to ease traffic congestion within the city, including the unsuccessful proposal to introduce congestion charging, the extension of city Controlled Parking Zones and other additional street calming measures.

## Feasibility Study and

## Initial Summer Trial of Hovercraft Service

Stagecoach plc has been developing a novel venture that would help to deal with commuter traffic entering and leaving Edinburgh from/to Fife and this entails the commissioning of a permanent hovercraft passenger service.

Hovercrafts are commonly used in a global perspective and are typically used in areas where there are environmentally sensitive issues for example, within the Everglades in Florida (subtropical wetland National Park) and within other nature conservation areas such as the ornithologically important wetland of Roebuck Bay in Australia and within Antarctica. A BHT 130 hovercraft (the same craft proposed for this service) is also currently being built in Seattle, USA for a passenger service between the village of King Cove and the Cold Bay airport in Alaska. Feasibility studies were completed for the King Cove Environmental Impact Statement (EIS), which studied the performance under different wave and wind conditions. However, there is little information available with respect to their use in the UK, with only one current permanent service operating at the Isle of Wight. For this reason, and to meet with the legislative requirements of the Habitats

Photograph 2: Aerial photograph of Kirkcaldy Bay and Beach  
Photo: Gayle Pearson Boyle



Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora), the Birds Directive (Council Directive 79/409/EEC on the conservation of wild birds) and the Habitats Regulations (Conservation (Natural Habitats, &c.) Regulations 1994 and Scottish amendments), a detailed ecological assessment was required to gain permission for an initial two-week trial to proceed.

The Firth of Forth is a European and internationally designated site - Special Protection Area (SPA), Ramsar site and Site of Special Scientific Interest (SSSI) - for its ornithological interests, particularly its population of wintering wildfowl and waders and its important assemblages of waterfowl. As part of the proposal, AMEC Earth and Environmental (UK) Ltd were commissioned by Stagecoach to provide ecological and ornithological advice in support of an Appropriate Assessment, which would be undertaken at the planning application stage by the Competent Authorities. Working from an early stage with Scottish Natural Heritage (SNH), a 'screening assessment' was completed to determine whether there would be a 'likely significant effect' upon the SPA/Ramsar site. This report concluded that there would be no likely significant effect on the site and that an Appropriate Assessment would not be required. However, SNH felt that there were still a number of issues that required addressing before this conclusion could be reached and requested further ecological assessments including ornithological surveying of the affected coastline and of the effects of the hovercraft during operation. A scope of works was therefore agreed and

completed, which included monthly intertidal ornithological surveys, which followed an adapted Wetland Bird Survey (WeBS) methodology to allow for additional recording of existing disturbance levels. The surveys helped to record the numbers and species of birds that were present over the winter months (November 2006 to March 2007) along with data on their behavioural patterns within certain areas of the Firth that would potentially be affected by the proposal.

A two-week trial was permitted during July 2007 to further inform the assessment of the disturbance effects upon bird life as well as for other operational and feasibility reasons and noise nuisance tests. The trial was completed and ornithological data collected to assess bird reactions to hovercraft presence (through observations of the operating hovercraft from an adjacent chartered boat).

### Vital Statistics

The hovercraft used for this initial 12 day trial period was a British Hovercraft Technology BHT-130 (Photograph 1). This type of hovercraft is approximately 26 m in length with a width of 15 m and payload of 22 tonnes. There are four engines at the rear of the craft; two of the engines are responsible for driving the centrifugal fans which provide air for the skirting and allow hovering, while the other two engines are used to drive the airscrews which propel the machine. There are also two bow thrusters to allow greater manoeuvrability while in the landing area. Each engine is diesel powered and produces approximately 900 horsepower (hp). The hovercraft has a passenger capacity of approximately 130 persons.

The hovercraft has a very low 'footprint pressure' and is able to cross beaches without leaving a permanent imprint on the surface. The pressure that the hovercraft will exert on the beaches and the water surface is approximately 1/30th of a human foot. The average human being standing on ground exerts a pressure of about 3 lb per square inch (20 KPa), and that increases to 25 lb per square inch (172 KPa) when walking.

**Photograph 3: Aerial photograph of Portobello Beach Landing Area**  
Photo: Gayle Pearson Boyle



In contrast, the average hovercraft exerts a pressure of only 0.33 lb (2.2 KPa) per square inch and this decreases as speed increases. Put into context, this 'footprint pressure' is described as being below that of a seagull standing on one leg. The wash is also extremely low in signature.

With this mode of transport there is no requirement for any channel dredging or dock/pier construction and the hovercraft will travel up a beach/coast without any significant disturbance. On this occasion, temporary landing pads (30 m<sup>2</sup>) were constructed on either side of the Forth. The beaches at Kirkcaldy and Portobello (Photographs 2 and 3) were prepared to allow a special sectional composite tile surface to be laid. This provided a smooth surface for the craft to land and also minimised the amount of sand that passengers had to walk on. When passengers disembarked at Edinburgh, they were then able to board connecting bus services providing a direct link to Edinburgh city centre. The Stagecoach former bus depot at Kirkcaldy was re-furbished to provide a link to existing established bus services.

Key statistics for the trial were:

- Journey length – 9.5 miles
- Number of crossings – 288 (12 round trips per day)
- Average crossing time – 17 minutes
- Typical crossing speed – 38 knots
- Average load 112 passengers – 85.7%
- Passengers carried – 32,099
- Fuel consumption for trial – 301 litres/hour
- Little discomfort to service during Force 6-7 south easterly winds
- Cost of trial – approximately £300,000 (with £90,000 grant contribution from South East Scotland Transport Authority)

A report was then produced and submitted to SNH providing baseline



**Photograph 4: Griffon 2000TD 12 passenger craft used during winter ornithological surveys (passing Inchkeith Island)**  
Photo: Gayle Pearson Boyle



**Photograph 5: Eider ducks within 15 m of the hovercraft**  
 Photo: Gayle Pearson Boyle

information on the ornithological value and interest of the intertidal and offshore areas gathered from desk study/consultations, coastal and boat-based surveying. Coastal data previously purchased from the British Trust for Ornithology (BTO) WeBS Co-ordinator for previous years was used to supplement the survey data.

### Ornithological Assessment

At both Kirkcaldy and Portobello, the beaches are regularly frequented by recreational users including walkers, joggers and dogs. At Kirkcaldy, significant roost sites were recorded on the rocks and offshore islands to the south of Kirkcaldy (Photograph 2). Although disturbance to birds was low, the presence of this feature would require consideration during routeing of the hovercraft. There were no identifiable roost sites at Portobello, with congregations of waders and sea ducks present at the extreme of the survey boundary. This was a reflection of the habitat suitability, which was again more rocky and 'broken up' in comparison to the flat sandy stretch surrounding the landing area (Photograph 3). There was no evidence either to suggest that the small numbers of sea ducks visually recorded foraging and loafing at sea were disturbed or displaced significantly by the hovercraft. Any birds temporarily taking off were resettled after an average time of less than four seconds. Surveying confirmed that there were no large congregations or rafts of sea ducks present within the offshore estuarine waters, along the potential hovercraft routes, this information being key to the assessment.

Due to the logistics of arranging the use of a hovercraft and completing the trial, it was undertaken within the summer months when the key winter species have either migrated away from the Firth or are present in much smaller and less

important numbers. It was therefore the intention that the trial would be repeated during the winter months.

Following on from the popularity and success of the initial summer trial and the conclusions of the summer trial ornithological report that was submitted to SNH for comment, it was decided that there would be little impact upon intertidal birds present within the vicinity of the landing areas and the surrounding area. However, since the Firth of Forth is of importance to wintering assemblages of waterfowl, additional information needed to be gathered regarding the distribution and behaviour of offshore sea duck populations along the hovercraft routes.

### Winter Trial

Agreement was reached between Stagecoach, SNH and the other relevant authorities to allow an additional trial to take place during February/March 2008. This trial was not open to the public and involved the use of a smaller, one-engine, 12-passenger hovercraft (Griffon 2000TD) (Photograph 4). The specific objective for this survey was to:

- complete pre-trial and post-trial ornithological and ecological survey along the routes of the hovercraft to ascertain sea bird population distribution and species presence and record any important aggregations, along with sea mammal presence; and
- during the trial, undertake surveys of sea bird populations focusing on observations of behavioural response to the hovercraft operation, along with sea mammal presence/reaction.

Once again, a boat was chartered to allow unimpeded observation of ornithological reaction to the hovercraft during its operation. The methodology was agreed with SNH in advance to ensure data collation was as efficient as possible. A marine ecologist was also present on the boat to undertake marine mammal surveying and assess disturbance levels on these species.

Although unsuitable weather conditions interfered with original schedules, the trial took place between 28 February 2008 and 4 March 2008. Pre-trial surveying was completed between 16 and 20 February 2008, while post-trial surveying was completed between 11 and 18 March 2008. For the pre- and post-trial surveying, transects were completed from coast to coast along three preferred hovercraft routes with an ornithologist recording all bird species, numbers and behaviour. These covered a variety of wind and tidal conditions. During the trial, a set number of viewing points or stations were surveyed at key locations along the routes where offshore congregations of birds had been recorded at higher levels. At these locations the position and behaviour of individual birds were recorded before, during and after the hovercraft passed and their reaction to the craft was observed in detail. This allowed sufficient information to be gathered to further inform the Appropriate



**Photograph 6: Long-tailed ducks showing some avoidance behaviour to the passing hovercraft**  
 Photo: Gayle Pearson Boyle



Assessment process.

The detailed results that arose from this work concluded that there were no large congregations of sea ducks present within the offshore waters along any of the three proposed hovercraft routes. The largest numbers were present within the coastal waters (within 2 km from the shore). This distribution is most likely related to foraging and feeding behaviour where shallower water results in more effective hunting of prey. For those individual gulls and auks loafing in the offshore waters, the data suggested that the majority of birds were non-reactive to the hovercraft. On several occasions, some species (e.g. eider *Somateria mollissima*) were within 15 m of the hovercraft but showed little or no avoidance behaviour (Photograph 5). On other occasions where there was some temporary displacement, it appeared no different to existing disturbance in terms of other sea faring vessels within this busy shipping channel. Within the coastal waters, species including long-tailed duck *Clangula hyemalis* (Photograph 6), Slavonian grebe *Podiceps auritus*, velvet scoter *Melanitta fusca* and common scoter *Melanitta nigra* were observed in small numbers with larger populations of eider.

In terms of sea mammals, two key haul out sites on rocky outcrops were identified for grey seal *Halichoerus grypus* (Photograph 7) as well as a favourite lying out area on one of the navigation channel marker buoys. Seals lying on the buoy came within 5 m of the hovercraft but their behaviour did not appear to be influenced in any noticeable manner. The haul out sites were not affected in any manner, with seals continuing to laze about and not even raise their heads when the hovercraft passed approximately 300-500 m away. There were also limited sightings of harbour porpoises *Phocoena phocoena*, particularly in the deeper shipping waters and there is obvious potential for vessels to strike these animals, however with the hovercraft having no protruding parts or external propellers the risk of injury or disturbance was considered insignificant. SNH advised that a European protected species licence for cetaceans was unlikely to be required for any future permanent hovercraft proposal.

Advice was provided to Stagecoach on the preferred routes that should be used by the hovercraft as far as possible when weather conditions allow. The main



**Photograph 7: Grey seals watching the hovercraft approximately 150 m away, seemingly undeterred by its presence**  
 Photo: Gayle Pearson Boyle

routing advice involved a preference for routes that were furthest away from the coastline rocks at Kirkcaldy as well as from Inchkeith Island, one of the Firth of Forth unpopulated islands.

### The Future?

Through the completion of detailed ecological survey work and on-going consultation with SNH, it has been possible to address, in a timely manner, the developer's responsibilities under the Habitats Regulations, by producing adequate supporting information to assist the Competent Authority with the completion of an Appropriate Assessment. Stagecoach plc are satisfied with the economic and environmental viability of their hovercraft proposal for the Firth of Forth and are now hoping to shortly submit a planning application for the operation of a permanent passenger service operating between Kirkcaldy and Portobello. As part of the planning process, an Appropriate Assessment will be undertaken by City of Edinburgh Council and Fife Council (as Competent Authorities), which will involve formal consultation with SNH. With overall support for this innovative transport solution and

with SNH now having agreed that there is likely to be no adverse effect on the integrity of the SPA/Ramsar site, Stagecoach, as one of the leaders in this technology, should now be allowed to develop this service fully and demonstrate the carbon reducing benefits that such opportunities can offer.

### References

Scottish Executive (2006) *Scotland's National Transport Strategy*. December 2006.

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### Ecologists/Environmental Consultants

Ecologists/Environmental Consultants sought to join a rapidly growing consultancy in Dublin, Ireland.

**Ecologists** - Candidates must have a min 3 yrs employment experience in ecology, (preferably consultancy) and a degree in ecology or related discipline.

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# How Do You Solve a Problem Like *Sabellaria*?

Jane Lancaster\* and Anne Savage\*\*

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**C**umbria is famous throughout the world for the spectacular scenery of the Lake District, but it also hosts dramatic formations along its coast, which are much less well known (Figure 1). Few people ever see these strange termite mound-like workings, as the Cumbrian coast is rarely explored by the hordes of tourists who come to marvel at the mountains. Those that do venture down to the coast often miss these bizarre formations, as they are only exposed at low tide. Thus for many years the workings of a small polychaete worm called *Sabellaria* were known only to the few fishermen, beach combers and marine biologists who ventured down onto the lower shore at low tide.

This all changed with the advent of the Habitats Directive, which defined the workings of the humble *Sabellaria* worm as 'biogenic reef', an Annex I habitat and therefore potentially worthy of designation as a qualifying feature of a Special Area of Conservation (SAC).

## Ecology of a Community Builder

There are two species of reef building *Sabellaria* in the UK:

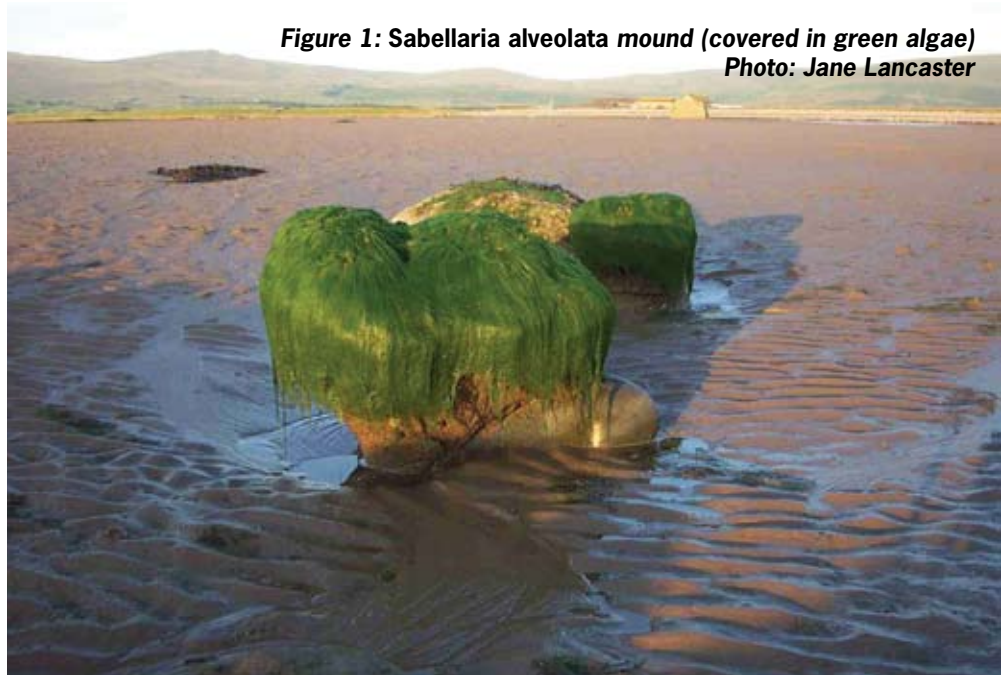


Figure 1: *Sabellaria alveolata* mound (covered in green algae)  
Photo: Jane Lancaster

*Sabellaria alveolata* (the honeycomb worm), which lives in the intertidal zone (and very occasionally subtidally), and *Sabellaria spinulosa* (the Ross worm), which lives subtidally (and occasionally on the extreme lower shore). Neither species is confined to the Cumbrian coast, but are found throughout Britain. *S. alveolata* is most abundant on the south and west coasts of the UK, with isolated records from the south east and east coasts (*S. alveolata* reefs are on the northern extremity of their range in the UK). *S. spinulosa*, on the other hand, is found subtidally throughout UK waters, although reefs are found in only a few locations.

Both species are suspension feeders living within a tube they build from sand and shell fragments (Figure 2). The worms can be found living individually on shells and pebbles, or as thin crusts or dense aggregations forming sheets, hummocks or more massive formations up to a metre deep and hundreds of metres across.

*Sabellaria* worms do not appear to be particularly fussy animals, and require only a few key environmental factors for survival in British waters. Most important seems to be a good supply of sand grains to build tubes, put into suspension by strong water movement (either tidal currents or wave action). Both species appear to require full salinity water, but are very tolerant of polluted conditions. The worms need some form of hard substratum for attachment of their tubes (such as bedrock, boulders, pebbles, shell fragments or even artificial substrata). Once a colony has formed, additional worms may settle directly onto

Figure 2: Individual tubes and the brain-like honeycomb formation of *Sabellaria alveolata*  
Photo: Jane Lancaster



the colony, allowing large reefs to form even in predominantly sandy areas. The intertidal *S. alveolata* species is limited in its distribution by temperature, hence it is not generally found in the colder waters of the North Sea, however the subtidal *S. spinulosa* is more tolerant of colder temperatures and therefore is naturally common around the British Isles.

Jane Lancaster first began to monitor the *S. alveolata* reefs of the Cumbrian Coast 15 years ago for the Cumbria Sea Fisheries Committee, and became fascinated by these amazing brain-like formations (Figure 3). On some Cumbrian beaches they can cover areas of the shore hundreds of meters across, forming a meter high platform over the beach, binding up otherwise unstable rocky scar ground and providing a multitude of niches and habitats for other marine organisms to inhabit. Breadcrumb sponge and baked-bean ascidians are often found attached to their bases, while edible crabs hide themselves away amongst the honeycomb formations.

The presence of the reef also restricts drainage, thus creating 'rock' pools where otherwise there would be none. Within these pools, colourful seaweeds such as pink coral weed, red Irish moss and bright green sea lettuce provide a refuge for prawns, blennies and hermit crabs (Figure 4).

More recently the subtidal species *S. spinulosa* has become an increasingly significant environmental consideration. As *S. spinulosa* tends to occur offshore, few people have ever seen it; this situation is not helped by its tendency to occur in sediment laden water, which renders it difficult for even the keenest recreational divers to spot. It can be hard to convince the public that this worm is worth conserving!

*S. spinulosa*'s 'wow' factor and ecological importance may be hard for the layman to appreciate, but *S. spinulosa* worms are no less remarkable than their intertidal cousin. *S. spinulosa* has a wide distribution throughout the north-east Atlantic and is common around the British Isles, occurring as individual tubes, in small groups or as a thin crust over the seabed, as well as forming reefs which may persist for many years. Significant examples of *S. spinulosa* reef are present in the North Sea, Bristol Channel and the Wash. These subtidal reefs stabilise otherwise mobile sediment habitat, enabling the establishment of a diverse community of seabed species, particularly specialised 'crevice' animals, which would not otherwise be found in the area. Studies in the Bristol Channel found that areas of *S. alveolata* had higher faunal diversity (more than 88 species) compared with other marine communities in the area<sup>1</sup>.

## Reef Today...?

Undoubtedly *Sabellaria* colonies, both *alveolata* and *spinulosa*, are worthy of protection. But in terms of the Habitats Directive there is one problem – they are only classed as Annex I habitats when they form reefs. *Sabellaria* may occur as individual tubes, a thin crust, or aggregations right the way through to a full 50 cm tall reef. So how do you define a reef? This question applies particularly to *S. spinulosa*, as its offshore habitat makes surveying more difficult, time consuming and expensive (compared to wandering about on a beach – the standard *S. alveolata* survey technique). The definition of *Sabellaria* reef in the context of the Habitats Directive is 'a biogenic concretion forming hard compact substrata on solid and soft bottoms, which arises from the sea floor in the sublittoral and littoral zone'<sup>2</sup>.



Figure 3: *Sabellaria alveolata* reef in Cumbria - note small dog (1' 4" tall) for scale  
Photo: Jane Lancaster

In most areas *S. spinulosa* does not form reefs, but occurs as solitary tubes or in small groups encrusting pebbles, shell, kelp holdfasts and bedrock. When conditions are favourable, more extensive thin crusts can be formed, sometimes covering large areas of seabed. However, these crusts may only be seasonal features, being broken up during winter storms and quickly reforming through new settlement the following spring. These crusts are not generally considered to constitute true 'Annex I reef' owing to their limited extent and low elevation.

This has led to a great deal of discussion on when a *S. spinulosa* aggregation can be called a reef, and the assessment of 'reefiness' has become a key issue. In practical terms, a reef is often considered to be an area of *S. spinulosa*, which is elevated from the seabed and has a large spatial extent; within this reef, colonies may be patchy, and may show a range of elevations from the seabed. In UK waters, elevations of worm tubes up to 30 cm have been recorded, and spatial extents of more than 1 km<sup>2</sup>. Bob Foster-Smith of Envision Mapping Ltd along with Vicky Hendrick at the University of Newcastle have developed a scoring system for assessing 'reefiness' of *S. spinulosa* reef after many years of assessing seabed habitats throughout the UK<sup>3</sup>. This system is based on a series of physical, biological and temporal characteristics of reefs, including patchiness, elevation and coverage. This was developed with the Habitats Directive in mind, in order to provide a distinction between what was a reef and what was not in the imprecise world of *S. spinulosa*.

## ... And Gone Tomorrow?

An additional problem with this wondrous worm relates to the stability and longevity of its reefs. In short, these reefs can vanish!

So what makes some areas of reef disappear? For a change, human activity is not always to blame. In Jane's 15-year study of the *S. alveolata* of the Cumbrian coast she has seen vast areas of reef gradually smothered by edible mussels in a matter of a few years (e.g. at Barn Scar, near Drigg). Intertidal *S. alveolata* are also vulnerable to cold temperatures during winter, much reducing the coverage of reef. The factors affecting offshore *S. spinulosa* reefs are less well understood, although thin crusts of *S. spinulosa* can easily be broken up by storms, and some reefs seem to degrade naturally as a result of erosion and natural variations in the recruitment and survival of worms.



Figure 4: A 'rock' pool created by Sabellaria reef  
Photo: Jane Lancaster

However, *Sabellaria* reefs (both subtidal and intertidal) are also at risk of damage from trawling and dredging. The disappearance of substantial areas of *S. spinulosa* reefs in the German Wadden Sea since the 1920s is likely to have occurred due to intensive trawling in this area<sup>4</sup>. *S. spinulosa* often establishes in gravelly areas, which are also a target for aggregate dredging. Whilst vulnerable to the resulting physical disturbance, there is evidence for the re-establishment of *spinulosa* communities when dredging ceases. Secondary effects of human activity, such as changes in sediment dynamics, turbidity levels and current patterns, may also influence the survival of *Sabellaria* reef.

## Conservation Conundrum

The fact that *Sabellaria* worms can form long-lived reefs, and yet can also disappear over the course of a few years, creates a problem for conservation agencies, offshore developers and marine consultants alike. The conservation agencies have a duty to protect examples of these reefs (where they form qualifying Annex I habitats and/or priority BAP habitats/species), but how do you protect a marine feature which may disappear naturally? If you are an offshore developer, your development may be constrained by the presence of *Sabellaria*, prompting the implementation of expensive avoidance or mitigation schemes, only to find the feature that you were trying to avoid has moved.

The elusive nature of *S. spinulosa* is well illustrated in the example of the Saturn Reef. This reef was first discovered in 2002 in the southern North Sea (offshore of the Wash) during a survey conducted for the CoconoPhillips 'Saturn' Pipeline. The reef was extensively mapped, characterised and photographed; it was found to cover an area approximately 750 m by 500 m, with an average elevation of 30 cm above the seabed. Following discovery of this reef, the Joint Nature Conservation Committee (JNCC) were keen to include it as a qualifying feature of the North Norfolk Sandbanks and Saturn Reef possible Special Area of Conservation (pSAC) (one of the marine SAC sites that has recently undergone extensive consultation). However, more recent surveys in the area found no evidence of the extensive reef that had been mapped previously. Acknowledging this,

JNCC are pursuing designation of the reef as a qualifying feature of the pSAC on the basis that the presence of a substantial reef in 2003 indicates that the area contains favourable conditions for reef formation, and is therefore worthy of protection<sup>5</sup>.

Whilst schemes exist for characterising the 'reefiness' of a particular *Sabellaria* aggregation, the difficulties with sampling offshore frequently result in a lack of data adequate for the definition of these characteristics for a *S. spinulosa* aggregation; in particular it is difficult to fully characterise its structure and associated communities, and difficult to assess the area of habitat (especially as it doesn't always show up on side-scan images). This presents an additional problem for conservation agencies, given the requirement under the Habitats Directive to calculate the area of reef habitat within the national context (which has not yet been accurately established for the

UK), the representativity of the reef habitat, and the level of conservation of structure and function. It is rare for a *Sabellaria* reef to be characterised as well as Saturn Reef was! These factors have been an issue in work undertaken in the southern North Sea by Entec and Envision for Natural England; despite evidence for the persistent presence of an area of *Sabellaria* for the last decade, the assessment of this area against Habitats Directive Annex III criteria has been problematic as a result of the lack of detailed and up-to-date information regarding topography and extent. However, Natural England are working towards gaining a better understanding of the distribution and extent of *Sabellaria* communities in these areas with the aim of including qualifying reef features within pSACs in this area.

## Conclusions

*Sabellaria* (both *spinulosa* and *alveolata*) have a variety of growth forms, ranging from individual tubes through to extensive crusts and reefs. Larger aggregations alter habitat conditions and can greatly increase seabed biodiversity. However, *Sabellaria* is by no means a stable habitat in the long term. Both reefs and crusts can persist for years; likewise they can form over the course of a summer and disappear during a winter storm. Crusts can develop into reefs, while reefs can diminish into crusts, and both are capable of disappearing completely due to anthropogenic disturbance. These characteristics make the management and conservation of *Sabellaria* a difficult and frequently controversial matter.

The location and characterisation of a subtidal reef can be problematic, and the placement of an identified reef within the national context of area and representativity causes additional headaches. At a strategic level, it seems necessary to reassess the methods of designating and protecting *Sabellaria* as a biogenic reef, particularly in the case of *S. spinulosa* reef, which is harder to characterise and monitor than *S. alveolata* reef. It is undoubtedly necessary to protect this habitat, but the current Annex I reef description appears inadequate for a habitat that exhibits a high level of variability in structure, extent and longevity. Is it acceptable under the current Habitats Directive

definition to designate a reef because it 'had been there' or because it 'might be there' in the future? And is it possible to set and monitor conservation objectives for a habitat that can disappear quite naturally?

Our activities in the sea can make life difficult for *Sabellaria*, but *Sabellaria* is perfectly capable of making life difficult for human conservationists! It is to be hoped that the difficulties of designating *Sabellaria* reefs can be overcome in order to conserve *Sabellaria* as both a species and a habitat-builder within UK seas.

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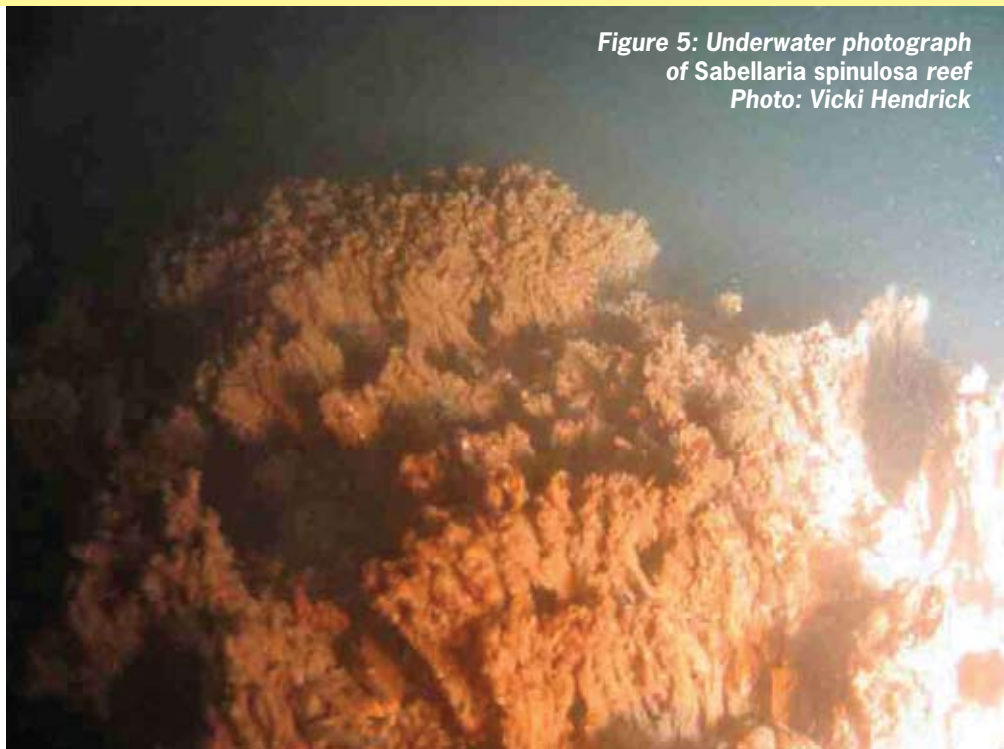


Figure 5: Underwater photograph of *Sabellaria spinulosa* reef  
Photo: Vicki Hendrick

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Hugh Williams  
 Research Liaison Officer (England), Forest Research

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Larva of the oak processionary moth *Thaumetopoea processionea* (only single specimen shown here) are a major defoliator of oak in Europe

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# Natural England Response to Cameron Crook and Hugh Watson

Jo Oldaker

Wildlife Management and Licensing Service, Natural England

**T**wo articles on protected species, with particular reference to Natural England's functions, appeared in the June 2008 edition of *In Practice*: Cameron Crook's 'What Kind of Profession Is This?' and Hugh Watson's 'Great Crested Newts and Their Protection: Are We Getting it All Wrong?'. We welcome discussion on these developing areas of nature conservation, and here we offer some comments on the issues raised.

Cameron Crook's article contained some misunderstandings. Natural England does not require consultants to provide an endorsement from a trainer from a local bat group if they wish to obtain a licence to disturb or handle bats in order to carry out survey work. Instead, applicants who have not held a licence before or in the last three years must provide two references (ideally from people already holding a bat licence) who can comment on their suitability to carry out the activities requested on their licence application.


We recognise that there are excellent courses run by organisations such as the IEEM and the Bat Conservation Trust. However, Natural England only issues licences to applicants who can demonstrate that they also have relevant practical field experience, this is normally gained via accompanying or being supervised by other licensees in their field studies.

Natural England welcomes the work of trainers within Bat Groups. The system for training bat roost volunteers was established to train those who wish to undertake conservation work and to volunteer on behalf of Natural England. The training includes dealing with sensitive issues such as re-assuring the public who are affected by bats, the practicalities (including Health and Safety) of undertaking roost visits and providing both verbal and written bat conservation advice. This training therefore has a different emphasis to that required for a licence but it is essential for those who wish to become Natural England volunteer bat roost visitors. The training was not designed to train ecological consultants in their specific roles, though of course some consultants are also volunteer bat workers, which we welcome.

Hugh Watson's views on great crested newt mitigation are thought-provoking and representative of many working in amphibian conservation. He paints a rather disheartening picture of the outcome of applying legal protection: planning and land management decisions that are increasingly prohibitive, and less proactive. Two key reasons for this situation are the Habitats Directive's requirement for a system of strict protection with no statutory defence, and an increasingly risk-averse culture from some licence applicants. Natural England shares Hugh's main concerns, and is exploring ways to resolve this predicament (as are authorities in other Member States, and not just for newts). That said, we should not overlook some significant improvements compared to the 1980s and early 1990s. Many more newt populations are detected in advance of development (when previously they would have been unwittingly destroyed), impacts are often eliminated or reduced, and mitigation more commonly provides

a net gain in breeding habitat. Opportunities for proactive work do exist: agri-environment schemes, such as higher level stewardship, have huge potential. Also, the new Pond Habitat Action Plan has spawned the *Million Ponds Project* thanks to Pond Conservation's efforts. Maybe we are not getting it all wrong?

Natural England recognises that many IEEM members (environmental consultants, local authority ecologists and statutory agency staff) play key roles in protected species work. Recent improvements to our licensing regime include the new guidance on risk assessment and proportionality in newt mitigation, as Hugh mentions. We are also working on guidance documents covering experience required for licence applicants, frequently asked questions about mitigation and licensing handy hints. These will appear on our website shortly – keep an eye on the *Latest News* section where the updates will be announced. ([www.naturalengland.org.uk/conservation/wildlife-management-licensing](http://www.naturalengland.org.uk/conservation/wildlife-management-licensing)). Natural England welcomes constructive feedback on the licensing process and has a facility through our project mailbox ([wildlifeprojectmanagement@naturalengland.org.uk](mailto:wildlifeprojectmanagement@naturalengland.org.uk)) to capture this.



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# Working Towards A Consistent Approach to Bat Licence Training

Louise Mapstone CEnv MIEEM  
Biodiversity Officer, Bat Conservation Trust

**The Bat Conservation Trust (BCT) would like to respond to the article on professionalism and bats by Cameron S Crook in the June 2008 edition of *In Practice*. In particular, we would like to update members of IEEM on work we are currently undertaking to address some of the issues raised in the article.**

## Best Practice and Standard Setting

Since its inception, BCT has been pivotal in contributing to best practice and standard setting in all areas of bat work. For example, last year saw the publication of BCT's *Bat Surveys – Good Practice Guidelines*. BCT worked collaboratively with an editorial board drawn from a wide range of organisations including both the private and public sectors, including many IEEM members, to produce these guidelines. They aim to considerably improve the standards of bat surveys conducted nationwide. A copy of this guidance can be downloaded via our website: [www.bats.org.uk/pages/professional\\_guidance.html](http://www.bats.org.uk/pages/professional_guidance.html).

BCT has also developed a range of courses to address particular skills gaps for professional consultants that were brought to our attention following discussions with a number of experienced bat consultants. BCT always highlights that while these courses can form an important foundation in professional bat work, clearly additional field work is required to become a competent bat surveyor.

## Lobbying and Partnership Work

In addition to these outputs, BCT has also lobbied the Statutory Nature Conservation Organisations (SNCOs) for a clear distinction between a Bat Roost Visitor Licence and other types of bat licences (*i.e.* Survey and Monitoring and Scientific licences) and ensure a greater consistency between countries. We continue to lobby on the quality control of the issuing and renewals of bat licences.

## BCT's Training Standards and Professional Licensing Scheme

BCT acknowledges that the current licensing system is at odds with the world of contemporary bat work, be that professional consultancy or voluntary work.

Currently, holding a bat licence enables the licensee to disturb and or handle bats. However, additional skills are required in order to carry out many aspects of bat work, for example designing mitigation. It can be confusing for any client employing a bat licence holder, to fully appreciate the extent of knowledge and experience of any individual bat worker. These issues were raised in relation to all protected species licences at a recent meeting with IEEM, the SNCOs and other non-governmental organisations (NGOs) on species licensing.

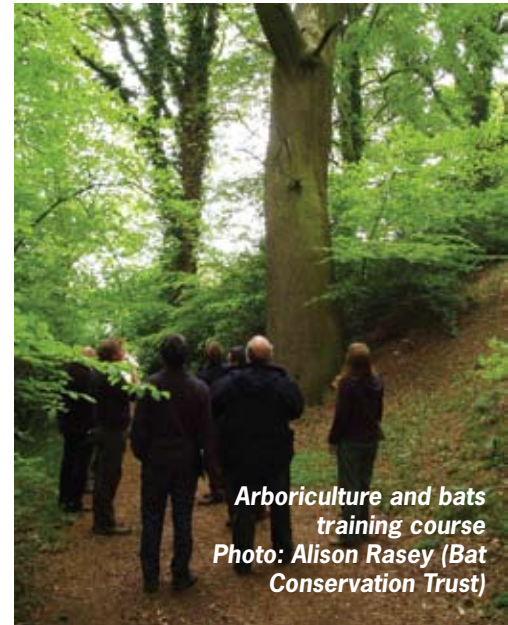
To address these concerns in the longer-term, BCT is continuing to develop two initiatives: Training Standards and

the Professional Licensing Scheme. A brief summary of the principle of each scheme is outlined below.

### Training Standards

This initiative involves producing training standards that define the skills, knowledge and experience that an individual bat worker requires to undertake different tasks. The approach has been drawn and adapted from National Occupational Standards that underpin qualifications such as the National Vocational Qualification (NVQ).

Firstly, all elements of bat work are broken down into different 'subject areas', for example: legislation, identification, handling, etc. 'Performance criteria' are then identified within each of these 'subject areas'. A simplistic example of how this principle could be applied to the subject area 'bat handling' is provided in Box 1 below.



Arboriculture and bats training course  
Photo: Alison Rasey (Bat Conservation Trust)

#### BOX 1: A potential example of a Training Standard for the subject area 'Bat Handling'

Three examples of performance criteria under this standard could be:

1. understand the legal basis for handling bats;
2. assess the risks involved in handling bats; and
3. use of suitable handling methods.

Different levels of skill can be identified for each performance criteria.

For example in relation to 'use of suitable handling methods':

- the lowest skill level would be that an individual 'must be able to hold a bat securely so it can be seen by others'; and
- a higher skill level would be that an individual 'must be able to manipulate and examine a bat to determine likely species, age and sex'.

N.B. Whilst this is a simplistic example, it illustrates the principle that each performance criteria may have a number of different bullet points at each level, and each subject area has a number of performance criteria.



BCT is currently working on training standards for a number of 'subject areas'. Once these standards have been completed, they can be applied to different audiences (e.g. ecological consultants, voluntary roost visitors, arborists and building professionals) at appropriate levels.

### Professional Licensing Scheme

At the BCT annual conference a few years ago, we conducted a consultation on licencing. The audience included volunteers, consultants and SNCOs. The proposals outlined a number of different potential structures for a professional licensing scheme for professional bat consultants. A number of different opinions were expressed but there was consensus on two key principles that any such scheme should include:

1. the separation of 'professional training' from the 'voluntary roost visitor system'; and
2. ensuring consultants pay something towards their training and experience.

Since this initial consultation, BCT has drawn together a professional licensing panel comprising bat workers that undertake both professional and voluntary bat work, from a range of geographical locations in the UK.

The professional licensing scheme is likely to include:

- an agreed syllabus, drawn up using the training standards;
- the development by BCT of a database of 'training providers' who have access to this agreed syllabus;
- a requirement for trainees to build up a log book of experience against the agreed syllabus;
- trainees, once they are considered ready, attending an

external assessment comprising a theory test, practical exercises and an interview about their log book; and

- examiners, if satisfied that the trainee had reached the appropriate level of competency required (at the relevant skill level), acting as a referee for a licence.

Further consultation and planning is still required but BCT hopes a pilot will be in place by early 2009. BCT has gained support from the SNCOs for this approach and we would welcome IEEM's endorsement.

BCT takes a flexible approach to bat training as it is important to recognise the conservation value of volunteering. Indeed, many bat consultants engage in considerable voluntary work in their spare time. We work collaboratively with a range of stakeholders to gain consensus on important issues. The development of training standards and a professional licensing scheme inevitably takes time to develop and refine. We will continue to keep IEEM updated on the progress of these two initiatives.

At this stage further details are not available on the scheme as it is still in development. If you would like to receive further information about the professional training scheme, later in the year, please send your contact details to [training@bats.org.uk](mailto:training@bats.org.uk) and we will add you to our mailing list.



**A bat sound analysis workshop**  
Photo: Shirley Thompson (Bat Conservation Trust)



**A lesser horseshoe bat *Rhinolophus hipposideros***  
Photo: Rob Parkin (Bat Conservation Trust)

Bat Conservation Trust



## Editorial Comment

Only the responses from Natural England and the Bat Conservation Trust to Cameron Crook's article 'What Kind of Profession Is This?' have been included in this edition of *In Practice*. We did, however, receive many responses and we would like to thank all of those members and non-members who provided comments.

# EcIA Questions and Answers

**The following are two questions that have been posed by members regarding the interpretation of particular parts of the IEEM Ecological Impact Assessment (EcIA) Guidelines. The EcIA Technical Group was set up following the launch of the Guidelines, its remit includes dealing with questions from members.**

## Question 1: Assessing Residual Impact

'When assessing the residual impact upon a feature, is the level at which the impact occurs ever reduced, or do we simply characterise whether it is significant or not at the level at which it was valued?' This to me introduces potential issues for those many cases when mitigation, for whatever reason, is not 'like for like'.

In order to explain why this question arises, here is a worked example:

A major new development involving the construction of a dual carriageway across open farmland is proposed and is subject to an EcIA. Baseline survey reveals traditionally managed, unimproved neutral grassland (NVC type - MG5) that is subsequently listed as a feature and characterised as being of 'Regional Value'. A significant negative impact upon the grassland will occur involving the construction of the new dual carriageway across half of its extent. Therefore, in the absence of mitigation it could be deemed that 'a significant negative impact at the regional level is certain'.

However, after mitigation (and compensation), how then is the residual significance of impact assessed? The translocation of grassland might be a possible mitigation solution for regionally valuable MG5 grassland, although this is limited by the fact that the most suitable receptor site is on the other side of the proposed carriageway. Furthermore, for practical reasons it is not possible to translocate all the grassland, so there is no like-for-like translocation of grassland turves. Similarly, we can expect that even with the most competent of operations that the odd turf may just not 'take', and similarly, that some of the species may be too prone to drought (or other poorly understood phenomena) so are unable to survive the process, thus potentially lowering plant diversity. Further knock-on effects might be incurred on invertebrate communities and mycorrhizal interactions in the soil-root interphase could be damaged. To compensate for these issues another area of land is set aside for grassland creation, which will take some time to establish. It would be reasonable to assume that no like-for-like replacement can occur with immediate effect and that it might take a considerable period of time, approaching 10-20 years or greater before the mitigation and compensation measures can be considered as a reasonable success. Despite all of this, the original situation can never be completely recreated as the bypass has severed the grassland, meaning that there are now two smaller grasslands rather than one large one.

How then do we assess the residual significance? The residual impact on this feature will certainly be lowered, although it is never likely to be completely offset. I note that the Guidelines avoid going down the route of, for example, stating that 'a significant negative impact at the District Level is probable in the medium term' (rather than at the Regional Level). I understand the reasoning behind this. It should be cut and dry, either it is a significant impact or it isn't. Likewise, the feature's value at the Regional level and therefore mitigation and/or compensation should accordingly be tailored to meet this level of importance. The alternative approach therefore, demonstrated in the EcIA, is that 'it is probable that a negative effect at the regional level is not significant in the medium term'. However, this approach introduces problems, the key problem of which is that mitigation and/or compensation may be able to deliver good results for part of a feature, but not all of it. For the remaining parts these may never be completely mitigated

or recovery may be achievable only over long time-scales. In cases such as this, which are many, how then do we make an assessment of the residual impact?

*Jim Fairclough MIEEM  
Senior Ecologist, Golder Associates UK Ltd*

## EcIA Technical Group Response

Within this case study, it can be argued that there is no true mitigation as the only effective mitigation for the impacts identified would be to change the design of the road to avoid the grassland. The two measures proposed to reduce the impact, *i.e.* translocation and grassland re-creation, are in fact compensation for the unmitigated loss and fragmentation of grassland habitat.

To assess the residual impact and significance, the impact assessment must first make clear the predicted impact: 50% of the original ecological receptor, a semi-natural grassland of Regional value, will be lost. It is not only the loss of the feature that needs to be considered: fragmentation of the habitat and the secondary effects upon other ecological receptors that may be associated with the grassland should also be assessed. All of these impacts in combination are likely to result in a significant impact at the Regional level. The compensation offered will not reduce the impact on the original receptor. However, it may work towards offsetting some of the ecological losses that are predicted.

The value of compensation habitats should be defined separately to the negative impacts on the original grassland feature. For the sake of argument, the compensation habitats include a new block of grassland, of equivalent size to the area lost, that will be created and managed appropriately. To increase confidence that this new species-rich grassland will develop as quickly as possible and achieve a similar habitat quality to that lost; good quality turfs from the area of grassland to be lost will be translocated (using standard translocation techniques) to 'seed' the new grassland and the new grassland will be contiguous with the existing residual areas.

In this example, the ecologist can reasonably predict the value of the total habitat resource at a pre-defined point in the future, say 10-20 years, based upon experience and published research. For the purposes of this example, it is assessed that the future value of the compensatory habitats will be at a County level.

With these two strands in mind, the residual impact could be described as follows:

*It is probable that a negative impact upon the neutral grassland feature will be significant at the Regional level in the long-term. However, it is probable that compensation measures will result in a positive effect that is significant at the County level in the long-term.*

In this example, the ecological impact assessment has clearly stated the residual impacts for each receptor, but has not directly compared the future value of created and translocated habitats with the value of those that are lost. It could be argued that the residual impact of the scheme as a whole is the loss in ecological value of grassland habitats from Regional to County in the long-term; *i.e.* the compensatory habitats do not fully offset the loss of the original habitat. However, it is quite feasible that, assuming the local nature conservation context is favourable<sup>1</sup>, the residual

impact of the whole scheme may be assessed as being not significant at either the Regional or County level.

### Implications and a Possible Future Solution

The Guidelines state that residual impacts are 'any significant impacts remaining after mitigation' (Para 4.31). Therefore, it is important that an EclA clearly states the differences between 'avoid or reduce' mitigation measures and 'replacement' compensation measures. In this case study, the Technical Group would advocate describing and assessing impacts on both *in situ* and compensation habitats separately; clearly describing the probability and time-scales required to reach the predicted value.

Calculating the residual impact for the whole scheme presents even more of a challenge. The Worked Example presented in the Guidelines (Para 4.55-4.56) describes impacts upon a 'simple' ecological receptor – a population of Cetti's warblers. In this example it is possible to directly compare the likely residual impact upon the population with and without compensation. In the example presented above, the compensation offered for a 'complex' receptor such as long-established semi-natural grassland can never truly be comparable with compensatory habitat creation: naturalness, representativeness, history and function (see Ratcliffe 1977) cannot be directly or quantitatively compared.

Therefore, in situations where compensation is offered at a habitat or ecosystem level, it is certainly easier to avoid direct or quantitative comparisons of value between existing systems and created habitats. However, in many cases, such as the example above, a qualitative comparison may be valid where the nature conservation context is understood. Understanding and describing this context is paramount when making a comparative assessment.

Comparative assessments are particularly useful where compensation or enhancement is not directly related to the identified impact: for instance where wetland habitats are created but woodlands are lost. In this case, it is essential that the impacts upon each receptor are separately described, before any attempt is made to compare or describe the 'trade' value of different habitats. It is interesting that as markets for trading carbon become established and the concept of a tradable market for ecosystem services becomes a reality, it may be that soon we have the tools available to quantitatively compare two very different types of habitat (or at least the services that they provide) to create a transparent and truly objective impact assessment.

A glossary of terms is available online at: [www.ieem.net/ecia.asp](http://www.ieem.net/ecia.asp)

**Bob Edmonds** CEnv MIEEM  
Associate Ecologist, SLR Consulting Ltd

<sup>1</sup> By 'favourable', I mean a consideration of the local abundance and connectivity of similar habitats within the geographical area.

## Question 2: Evaluation of Ecological Features

The IEEM EclA Guidelines appear to confuse many ecologists when it comes to valuing habitats and species. The confusion possibly arises over three key aspects:

1. The meaning and use of the word 'value'.
2. At what stage in the process we should assess impacts.
3. The geographical scale of reference.

### What Do We Mean by 'Value'?

The word 'value' is highly subjective. Section 3 of the Guidelines

states that in assigning a value to a species it is necessary to consider its *distribution, status and trends*. It goes on to emphasise *rarity* as an important consideration, when viewed in the context of *status* (e.g. declining, stable, etc.). However, many of these considerations in themselves will be subjectively judged. It is also not given that a particular level of rarity or a particular rate of decline directly translates to a particular 'value'.

Each ecologist is asked to make a 'professional judgement', based upon his/her knowledge, experience and available data. This can vary widely depending on the person concerned and the information available. We all know that even experts working within a narrow field of ecology can strongly disagree. Often, ecologists who are expected to make 'value' judgements are not national experts. Therefore, the subjectivity of individual professional judgement needs something to 'anchor' it to a wider consensus view.

One useful source of a 'consensus view' is the Biodiversity Action Plan. These are generally available at both national level and at county level. However, it is important to recognise that the presence of a Species Action Plan or a Habitat Action Plan in itself is not a direct measure of 'value' (whatever that means), but rather an indication that a species or habitat is a **Priority for Biodiversity Conservation** at the level of the BAP in which it features. For example a water vole colony on a site may be described as being a 'National Priority for Biodiversity Conservation'. By using this term, 'Priority for Biodiversity Conservation' we can actually do away with the more ambiguous term 'value'. We can do this because we are defining our terms. We can also have more confidence in this statement because it reflects a published, consensus view.

Now, I hear the cry: 'but not all BAP priorities are equal!' I would return that question by asking: 'equal on what (or whose) terms?' The message here is that unless you *define your terms*, it is not clear on what basis you are judging the 'value' of a feature. All that is being stated in the paragraph above is that a UK or County group of respected ecologists have agreed that this species/habitat is a priority for conservation action; over and above other species/habitats that they have considered. It's difficult to argue with that.

The BAP process also carries significant weight. The nine expert groups who carried out the recent review of UK BAP priority species and habitats<sup>2</sup> involved in excess of 500 experts! They used four scientific criteria to select BAP terrestrial and freshwater species:

- International threat
- International responsibility + moderate decline in the UK
- Marked decline in the UK
- Other factors where there is convincing evidence of extreme threat

The other advantage of using BAP priorities in this way is that it has real meaning for decision makers (e.g. local authority planners), who's statutory responsibilities and government guidance is based around BAP priorities and, in England, the CRoW Act Section 74 list.

This does not preclude an EclA author challenging the BAP consensus of what represents a priority. However, it does place a great onus on the challenger to come up with a better measure of priority/value; one that stands up to peer scrutiny.

BAPs are not the only tool we have available. Other short-lists such as 'Red Data' books and 'Birds of Conservation Concern' can and should add to the evaluation. And of course, the evaluator should avail themselves of the latest published (and peer-reviewed) research. This is all part of evidence-based decision making. Indeed, one would assume that these other sources have helped inform the BAP Priority lists.

Therefore, the recommendation here is to avoid the use of the term 'value' for species and habitat receptors, and instead use terms that:

- are better defined;
- have some wider professional agreement attached to them;
- have some published evidence-base; and
- foster consistency among practitioners.

### A Circular Process and 'Double-Counting' Impacts

In using the above approach, one senses a fear that ecologists may have of 'over-egging' the importance of a receptor on a particular development site. For instance, as some practitioners have noted the loss of an e.g. bat feeding perch for a more common species is substantially different to the loss of a maternity roost of a rare species. They go on to say that assigning a similar level of 'national' (or even international) importance would therefore be erroneous. Whilst most ecologists, would agree with the first statement, the second one may be flawed. This is because ecologists are often falling into a common trap when they are interpreting the guidance. Indeed the Guidelines themselves are are perhaps unwittingly encouraging this.

What seems to be happening is that in order to arrive at a 'value' for an ecological receptor on particular site, the ecologist is imagining in their minds the **loss** of that receptor under some hypothetical impact. In other words they ask themselves 'what would the consequences be for this species if it (or the features on which it depends) was lost from this site?' They then work backwards from this hypothetical 'impact' to arrive at a level of geographical value for the feature.

However, the Guidelines are explicit in stating that the evaluation should be **independent** of any impact assessment. The impact assessment should follow the evaluation phase, after a 'value' has been determined. If we are determining our values based on the postulated sudden absence of the feature from the development site, then we are essentially carrying out an impact assessment before we then carry out an impact assessment! In other words, in using this common approach we are double-counting impact magnitude and extent, and falling into a circular argument.

The Impact Assessment phase of the process should provide the local context necessary to properly assign scale and proportionality to our impacts. We should not be using the Evaluation phase to do the same. If we recognise this, then we should be less afraid of assigning a consensus view that a species is a 'National priority for biodiversity conservation' even if we know that our site is of relatively low importance for it. The Impact Assessment phase will account for this.

### Geographical Scales of Reference

The other area of concern and confusion relates to the relationship between rarity/status and geographical scale. This is particularly problematic with species, as important areas of habitats tend to benefit from designations at different geographical scales.

Rarity and status of a species is often a function of whatever geographical context one is looking at. Species which are relatively common and abundant in a particular county, for example, may be rare within a national context. Does this mean that a species population found on a site within this county is less 'valuable' than one found elsewhere in the UK? This seems to be a common interpretation of the Guidelines. However, if so, why does Section 3 of the Guidelines highlight the 'need to protect populations where the UK holds a large or significant proportion of an international species'? Logically, this line of reasoning would also apply to a county that held a large proportion of a rare/scarce UK species. So, if this large proportion is in need of protection then surely the value of its component parts (i.e. the sub-populations and the sites that support them) is high, in spite of (or indeed because of?) their

local abundance.

As a worse case, repeated low valuations by ecologists, could soon turn a locally/regionally abundant species (but nationally rare/scarce) into a very rare one indeed, if such low values result in cumulative erosion of their best habitat by decision-makers. This effect would be a tragic result of considering the local/regional context in isolation when evaluating species.

### So Where Does This Lead Us in Practice?

What this all leads to is a different outlook; one that accepts that it is OK to use nationally-recognised, published short-lists to assign the same level of priority to a species no matter where it is found in the country, and feel confident in doing so because you are not making claims beyond what those lists claim themselves. You are defining your terms and not straying too far into personal subjectivity. It's an approach whereby you can capture the lower ecological impacts of a development without having to 'under-value' species that counties, the UK and Europe are trying hard to prioritise for conservation across their territories. With this approach we should be able to conclude in our EclAs that:

*Species X is a **National priority** for biodiversity conservation (UK BAP) and protected under European/UK legislation... However, the discrete impacts to Species X brought about by this proposed development are of **District significance** if considered on their own. It must be borne in mind that multiple, similar impacts from other, future developments may have a cumulative effect and increase the impact significance beyond the District scale. Future strategic plans and policies should reflect this risk.*

This statement is defensible and based on common, clear parameters. It accounts for both the discrete impact of the development being assessed, but also recognises its part in the longer-term impacts of development control decisions. Most notably, there is a complete absence of the word 'value'.

*Richard Andrews CEnv MIEEM*

### EcIA Technical Group Response

Richard's article poses some challenging questions about the use of valuation in the EcIA process. I do not agree with all of his arguments, especially on 'double-counting', but do share some of his concerns about the valuation process.

At Entec we have been developing a system, over the last few years, which has some similarities to Richard's 'Priorities for Biodiversity Conservation' except that, having used these 'Priorities' to define the species, habitats and sites that need to be assessed, we allocate a value to each. For species and habitats, we then use a threshold (county value) to define the scope of the assessment in terms of which species and habitats require more detailed assessment (notwithstanding the need also to consider legally protected species and species that are valued for socio-economic reasons). This approach reflects our view that it is only necessary to assess the effects on the 'most important' habitats and species, on the basis that only these effects are likely to have a bearing on the planning (or other) decision-making process. (Opportunities may, though, be taken to modify the scheme design in response to the presence of less important habitats or species)

The new UK BAP list of priority species generates a problem for the application of our approach, in that there are now many more species that are 'Priorities for Biodiversity Conservation' and many more sites that support one or more of these species (especially as the list now includes more common species e.g. house sparrow, hedgehog and common toad). Consequently, the continued use of our existing threshold approach could require much more 'on-site' survey work in order to assign levels of value. Even if we were to do this, however, there would often be insufficient 'off-site' survey

data to make a robust judgement about value (which is a problem that pre-dated the new BAP list).

Given these and other concerns, we are considering various alternatives to the use of the value threshold when scoping our assessments. These include the use of professional judgement about the likelihood of a significant effect based upon: the likely size of the species population that could be affected, which in turn will be informed by the characteristics of the affected habitats and their suitability for the species, as well as available distributional and population data; and information about the sensitivity of species/habitats to the environmental changes that are likely to be caused by the development.

Using whichever approach we agree upon (which could even be the retention of the value threshold), the outcome will be a short-list of habitats and species for which detailed assessment will be carried out. Herein lies another challenge, especially for species, namely that the need (under the EclA Guidelines) to assess effects on their conservation status begs the question of what is the population upon which this assessment should be made? For example, with widespread and mobile species that do not have discrete local populations, should the 'population' be the few individuals that occur on the development site or the wider population of which these individuals are part? If the latter, how should this population be defined (e.g. at the county level for widespread species such as skylark and the catchment level for species such as otter)?

In conclusion, what I have described above is very much work in progress. But I hope that it may encourage others to think laterally about the issues as well as highlighting that we all need to be challenging our approach to EclA - working within the broad framework that is provided by the Guidelines but not slavishly following them. They are only guidelines!

**Richard Knightbridge** CEnv  
MIEEM

*A Technical Director of  
Ecology, Entec UK Ltd*

<sup>2</sup> UK BAP Partnership (2007). *Report on the Species and Habitat Review.*

# EcIA Practitioners' Seminar

*John Box CEnv FIEEM, Richard Knightbridge CEnv MIEEM,  
Gemma Langdon-Saunders and Linda Yost CEnv MIEEM*

**T**he Ecological Impact Assessment (EclA) Practitioners' Seminar, held on 10 June 2008, was the first occasion, since the launch of the EclA Guidelines, that practitioners had come together at an IEEM organised event on this topic. Each of the more than 30 attendees had experience of applying the Guidelines, which provided a wide range of projects to illustrate the practical application of the guidance. Submitting a written question had been a prerequisite for a place on the seminar and provided the material for the day's discussions. This was an opportunity to ask questions, raise issues and discuss approaches that are being adopted within the context of the guidelines.

John Box and Richard Knightbridge, two of the authors of the Guidelines, provided an overview of how the companies they work for are applying the EclA Guidelines on a day-to-day basis.

Richard and John both explained that the Guidelines were being 'rolled-out' over time. In particular, both pointed out that the Guidelines are just that – *guidance* - a framework to work within and not a strict set of rules. Therefore, the approach in each of their companies is different.

Richard leads Entec's ecology team and also has technical responsibility for Entec's approach to EIA work. In undertaking EclA as part of an Environmental Impact Assessment (EIA), a key focus is not only the production of the Environmental Statement but also the evolution of the development proposals in order to reduce their adverse ecological effects and to maximise their positive effects. Assessments are only carried out of the 'evolved' scheme (i.e. with mitigation that has been agreed with the client having been incorporated into the proposals). To inform the decision about which effects to assess in detail, Entec uses a threshold approach based on the nature conservation value of ecological resources (see Richard's response on the previous page), in order to decide which resources could be significantly affected by the scheme. For each effect, a conclusion is reached as to whether it is likely (or certain) or uncertain. No other levels of certainty/uncertainty are considered relevant. Effects are defined as either significant or not significant.

Atkins has a system that has been developed and formalized over the past four years and consists of internal systems and internal guidelines. EclAs are used in two situations: either in support of a planning application (or application for a formal consent) or, as the ecology chapter of an Environmental Statement. In terms of impact assessment, matrices relating significance of impact to magnitude of impact and value of ecological receptor are not used; but they are still using defined terms for major to minor significance of impacts – broadly related to the IEEM Guidelines thanks to the early drafts. An evolutionary approach has been taken to transferring to the IEEM Guidelines through a series of one-day in-house workshops using a PowerPoint presentation (available from IEEM) as a basis to structure them. The expectation is that the attendees will have read the Guidelines at least once. It is expected that all the ecologists at Atkins will be using the IEEM guidelines by 2009. Atkins has a strong internal QA system and all ecological reports are independently checked and revised before going for a formal technical review. The cost of this is integrated into the budget.

IEEM is developing the EclA 'family' of documents. The *EclA Guidelines: Marine and Coastal* is currently being prepared for consultation and a version for Ireland is in hand and will be drafted in late 2008/9. The Guidelines have always been considered a working document and as such will be reviewed and updated in 2009/10, based on practitioners' experiences and any changes in legislation.

Outline information explaining the relationships between Strategic Environmental Assessment, EIA, EclA and Appropriate Assessment, will also be made available on the IEEM website.

IEEM would like to thank John Box and Richard Knightbridge for volunteering their time to chair the seminar and give particular thanks to Atkins for hosting the event.

# CPD Returns

Eirene Williams CEnv MIEEM  
Chair, IEEM Professional Affairs Committee

**A**t the meeting of the Professional Affairs Committee in April 2008, those present spent time reviewing the Continuing Professional Development (CPD) returns from 2006/2007. Members of IEEM should need no reminding that they are required under the Code of Professional Conduct (clauses 2.6 and 4.2) to submit an annual record of their CPD activities. This is usually and conveniently done together with membership renewals in October.

This year I can be less admonitory and slightly congratulatory! The proportion of members submitting their CPD returns has risen to 75%. This is a great improvement on previous years which averaged about 60%. So the message about the importance of CPD records to a professional seems to be sinking in. However, our target has to remain 100%, so some reminding, and even nagging, has to continue.

The Committee read through a random sample of 10% of the returns. Overall, the quantity and quality of the CPD recorded was felt to be fairly satisfactory. However, comments were made as follows:

- Length of CPD undertaken: some people recorded less than

the required 20 hours of CPD. Whilst it is not necessary to list every single activity undertaken in the year in minute detail, some returns were overly brief and failed to provide convincing evidence of commitment to the CPD process.

- Structured versus Unstructured CPD: this distinction seems to cause confusion to most people so we plan to remove it in future unless some very good reason emerges for its retention. We may need to compare our procedure with that of other professional institutes in this respect.
- Type of CPD undertaken: the overwhelming majority of CPD recorded involved species specific training, such as identification courses. This is not a problem in itself, but we would urge members to undertake a wide range of professional development including business skills, health and safety, involvement with policy at all levels, as well as IT, other generic skills and reading books!

So, our review of CPD concludes that the situation is improving but still requires some IEEM members to appreciate the rationale behind, and requirements of, CPD to a profession. At future conferences we plan to schedule informal sessions to clarify any confusions that members have about CPD. We also hope to stimulate Basil O'Saurus to submit for publication a model CPD return in his inimitable style!



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2nd & 3rd of February 09, 16th & 17th of February 09

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# IEEM Summer Conference Report

## Moving to an Ecological Economy... True Valuing of Biodiversity

Linda Yost CEnv MIEEM  
Deputy Executive Director, IEEM

**O**ver the past few years the 'valuing of biodiversity' has become more mainstream, with economists applying standard economic tools to value ecosystem services and thereby our biodiversity. But surely it should be ecology, not economics, that drives the valuing of biodiversity and our natural resources? The IEEM Spring Conference (London, 3 June 2008) posed the question 'with continuing loss of biodiversity, over use of natural resources, climate change, growing urbanisation, food shortages, increasing fuel prices, how do we measure and take account of the true value of biodiversity?'

**Peter Head**, Director from Arup, set the context for the day by presenting ideas at the global scale on *the emerging ecological age economy: industrial growth and sustainability*. Peter reflected on a 'shrinking earth', where 7.91 hectares per capita were available in 1900, which at current population growth will have reduced to 1.53 hectares per capita by 2050. He stressed the need to move away from the 'industrial age' model of development to scientifically-based sustainable development. Attention was drawn to the biomimicry principles set out by Janine Benyus as a guide for a transition to the ecological age. Peter considered 'city retrofitting' and also set out the work that is being undertaken in China to build a demonstration eco-city.

The conference presentations then looked at the policy drivers. Countdown 2010 is a powerful network of active partners working together towards the 2010 target of halting the loss of biodiversity and is developing new ways of doing business. **Shulamit Alony** pointed out that Governments alone will not reach the 2010 biodiversity target and need to be supported in their commitment to achieve the 2010 biodiversity target. She touched on the Lisbon Conference on Biodiversity and European Business, which had provided an opportunity to consider and further develop action in relation to biodiversity-related responsibility schemes, business-related biodiversity indicators, markets for biodiversity goods and services business and biodiversity partnerships.

Continuing the international/global policy theme **Vineta Goba** further expanded on the Lisbon process (2000) – that of making the EU the most dynamic, competitive, knowledge-based society in the world by 2010 and the Goteburg process (2001), the environmental dimension to the Lisbon process and the adoption of European biodiversity 2010 target. She explained the work of the European Centre for Nature Conservation (ECNC) Business and Biodiversity Programme in promoting the integration of biodiversity concerns with economic activities and the development of dedicated instruments for biodiversity investment.

A first for IEEM was the video presentation by **Brian Czech** from the Centre for the Advancement of the Steady State Economy. Brian addressed the option for an economic model that is not lead by Gross Domestic Product, which advocates growth, but instead one of a Steady State Economy that conserves biodiversity and maintains the economy at a steady state. He spoke of the 'Iron Triangle' of macroeconomic policy bounded and supported by Neoclassical Economics, politicians and corporations and how ecological economics needs to change this. The video can be viewed on the

IEEM website.

**David Calpin** presented Defra's recently launched *Securing a healthy natural environment: an embedding the ecosystems approach*. The action plan sets a new strategic direction for government policy on the natural environment with the intention of developing a more integrated approach focused on whole ecosystems that allows the value of ecosystem services to be fully reflected in decision-making. David stressed the need for more ecology and economics and for more inter-disciplinary working to address gaps in the evidence base (e.g. ecosystem functioning, impacts of change on ecosystem services, valuation methodologies).

**Mike Christie** moved the conference on from the policy side and outlined the evaluation techniques being used in a Defra study on *Valuing the UK Biodiversity Action Plan (BAP)*. This work is not yet complete but the first steps in the valuation work have been to establish links between habitat and species BAPs and ecosystem services and to give an estimate the value of the welfare benefits from ecosystem services; the combination of these would then provide a total economic value of the UK BAP. There are considerable challenges to undertaking the work, not least how to deal with 390+ species action plans! The final report will be out in December 2008.

Further research is being undertaken by a team including **Salman Hussain** on the *Valuing of UK marine biodiversity affected by nature conservation proposals within the Marine Bill*. The work has been generated by the UN World Summit on Sustainable Development requirement for the establishment of representative networks of marine protected areas by 2012. The questions being posed are 'what is the economic rationale?' and 'can such a policy intervention be substantiated?' The valuation results to date give an estimated mean annual benefit range of £2.2 billion to £4.4 billion per year (at least twice estimated costs) but this is considered an underestimate as it does not include several benefit categories.

The Severn Barrage is exercising the minds of ecologists and economists, and **Morgan Parry** provided facts and figures in relation to the costs of building and production from the Barrage. The responsible Statutory agencies in 2006 stated: 'A Severn Barrage would not be possible within the current legal framework provided by the EU Habitats and Birds Directives... we cannot envisage how required compensatory habitat could be provided to replace those that would be lost.' Morgan called for a full evaluation of the estuarine ecosystem services, which he believes is currently falling on deaf ears at the Department of Business, Economics and Regulatory Reform.

**Paul Goriup** addressed the issues from the practitioner's side, presenting his work that utilises the resources of the ethical investment movement for promoting ecologically sustainable development and wise use of natural resources, especially in Eastern Europe. Since 1999, Fieldfare plc has undertaken investment in four projects in the Lower Danube region of Ukraine. Their approach is that of promoting ecologically sustainable development; wise use of land and natural resources; and fostering local employment and developing business activities that monetise nature, have a 'net ecological benefit' and provide a positive platform for utilising the resources of the ethical investment movement.

**Sir John Harman** wrapped up the day with a very thought provoking discourse – see the full text on the following pages.

# Moving to an Ecological Economy

Sir John Harman  
Former Chair, Environment Agency

This article is based on my address to the IEEM Summer Conference on 3 June 2008.

**You might be forgiven, dear reader, for thinking that this is a piece of barefaced cheek; an article on environment and economics in a journal read by environmental economists by someone who is neither an ecologist nor an economist. Talk about brass neck.**

But stay with me; after half a lifetime working on the political interface I am also that mysterious figure on which so much qualified effort is expended; a decision-maker, and an advisor to decision-makers. That makes me a client for both ecological and economic science. I want therefore to make a plea on behalf of your political, legislative and executive customers; well, not so much a plea as a bellow of frustration.

Let's start with the problem, and let it be expressed by an ecologist, Janine Benyus:

*'We are... beholden to ecological laws, the same as any other life form. The most irrevocable of these laws says that a species cannot occupy a niche that appropriates all resources... any species that ignores this law winds up destroying its own community to support its own expansion.'*

I am sure that anyone reading this journal will regard this as a statement of the obvious; but it is not a thought that has often troubled our politics, electoral or otherwise.

But now it has to; and that means principally that it must be brought alongside our economic thinking. The inescapable truth is that our economy relies on physical systems which are part of the biosphere.

This hasn't so much mattered until now. We began as a small population in a large world. Local economies have always been limited by local ecological constraints, but it is only in the last couple of generations that our global economy is becoming limited by global ecological constraints such as climate impact. Classical economics doesn't

deal well with these constraints because when it was being thought out, they were not recognised as especially relevant.

We respond to the constraint by trying to work out how to incorporate natural resource calculations into our mainstream economic models. Here is that rare creature, an environmental economist, Herman Daly:

*'Economic logic remains the same; but the pattern of scarcity in the world changes, with the result that behaviour must change if it is to remain economic. Instead of maximising returns to and investing in man-made capital (as was appropriate in an empty world), we must now maximise returns to and invest in natural capital (as is appropriate in a full world). This is not "new economics" but new behaviour consistent with old economics in a world with a new pattern of scarcities.'*

You will see later that I don't quite buy the idea that there is no new economics, but I do support the conclusion that our current economic models have to incentivise natural resource efficiency very strongly. Indeed this seems to me the absolute central principle for our medium-term economic policy if we are really interested in climbing out of the hole we are still digging for ourselves in our pursuit of economic growth measured in monetary terms.

And boy, do we need to get out of that hole. Even though the body politic appears to have agreed that atmospheric greenhouse gas concentrations are an important target for public policy, the actions still lag the rhetoric and, worse, are badly out of touch with the reality.

Ah, the body politic. How is it measuring up to the challenge?

At first sight, it seems to be getting it. It's now a couple of years since the Competition Commissioner, Gunter Verheugen, not a notable green, said *"If something is ecologically wrong it can't be economically right"* which just about says it all. The key EU economic platform, the Lisbon strategy, makes explicit reference to the opportunities presented by pursuing greater resource efficiency. But in reality the dynamic of the Lisbon Agenda is short-term rather than long-term competitiveness;

for example the German government (Gunter is a German Commissioner) has been busy lobbying against tighter vehicle emission standards on behalf of its big-car manufacturers.

Here in the UK, Tony Blair - genuinely seized by this issue - made numerous statements about a specific form of resource efficiency, low-carbon energy, as part of his undoubted commitment to Climate policy. Yet progress is much slower than hoped, and a series of genuinely tough decisions awaits in Energy policy.

After he had challenged UK business to do better on Climate Change in September 2004, the PM got a response from 13 CEOs of major international companies offering a new partnership with Government but also observing that...

*'the private sector and governments are caught in a "Catch-22" situation with regard to tackling climate change. Governments tend to feel limited in their ability to introduce new policies for reducing emissions because they fear business resistance, while companies are unable to take their investments in low-carbon solutions to scale because of lack of long-term policies.'*

But sadly the far-sighted response of these major CEOs is not typical of business as a whole. The interventions needed to shape our economy to adapt successfully to ecological constraint are almost universally resisted.

In this regard as in others institutions such as the Confederation of British Industry (CBI) and the City are rooted in the economic consensus of 20 years ago, that regulatory interventions are always an economic bad, economic instruments are always more efficient and that there are no profits, at the level of the firm or of the economy, in environmental performance.

But that thinking is dangerously out of date. In fact, within mainstream economics there is now a body of work that recognises that future competitiveness will depend on high resource efficiency. This is a position - as put forward, for instance, by the Aldersgate Group - which I am keen to encourage even though I don't think that classical economics is enough to deal



Sir John Harman



adequately with our present reality.

Even though there is some recognition of the fact that we are now draining our natural capital, the reality of day-to-day politics shows that this fact is not taken seriously. If we look at the current state of play we can see a number of significant examples of this.

Firstly, the UK environmental agenda is routinely seen as a regulatory 'burden'. The Government responds to business and political pressure with reviews (e.g. Hampton), establishes the Better Regulation Executive which is then edged into deregulation, and brings out new legislation. The Regulatory Enforcement and Sanctions Bill, currently going through Parliament, was presented quite bluntly as a deregulatory measure when the minister, Lord Jones, introduced it in the Lords, and hardly any parliamentarians spoke in support of the Bill's provisions for new penalties for enforcement.

Secondly, starting roughly with Labour's second term, burgeoning social expenditure has begun to squeeze other spending with the result that Government, regardless of party, is bound to be more than ever risk averse to anything which might be seen to reduce short term economic growth and tax revenues.

Thirdly, the consumer crunch makes Government of any stripe unwilling to carry through any policy on resource consumption that relies on a price signal. It also becomes helpless in the

face of rising commodity prices precisely because it has not prepared itself or the electorate for the end of the era of artificially cheap resources.

The EU is also concerned about low growth, and in face of Asian competition and increasing social burden (e.g. in the cost of pensions) questions the affordability of EU environmental standards. It is also ready to allow large exemptions from, say, carbon caps to protect sectors of its industry most at risk from a combination of competition and high carbon input, rather than use the opportunity for technology forcing to gain greater future competitiveness.

None of this should be surprising; nor should it be a cause for damning politicians either individually or as a class, unless it is to say that we wished that they had had more foresight when hardly anyone else had it either.

But the inertia involved in now changing our politics to meet dawning reality is immense. Politics in the democracies over the last 70 years or so has equated success with economic growth as currently defined and any personal economic detriment is political failure.

So Government does not have the context of principles - what we have learnt since 1997 to call the 'narrative' - to sustain positions that attempt to allocate the correct costs to resources.

There are formidable electoral obstacles to this. In the carbon realm, rising fuel costs and the resultant general inflation on core shopping basket goods will quite simply see you out of office; or again, in its address to system-wide as opposed to consumer carbon, Government has made most headway in policy for the built environment and to some extent power production, but has just not been able to contemplate the necessary actions in the field of transport because of electoral response.

When it comes to politics, 'it's the economy, stupid'. This doesn't just apply to the West. In the developing economies the pressure for cheap consumption is understandably greater.

But when it comes to our fate as a species and our long term well-being as individuals, it isn't the economy; it's the ecology, stupid. So we do need, in the long term, a new way of doing economics. And we need a transition strategy to get us from where we are to where we need to be.

The first rational response is to use the economic systems we are familiar with and to bring in values and costs for ecological resources or sinks.

Sir Nicholas Stern's report on the economic costs of carbon policy met with a chorus of approval, including from me, because it was a senior economist, getting serious about applying his discipline to the most pressing of the current threats caused by our outgrowing our place in the planet.

Politicians sat up and took notice in a way that they had not when there were no dollar signs attached to the problem - or there were but they hadn't been put there by the priesthood of the economy.

Now I would bet that the Stern estimates turn out wide of the mark, both underestimating the costs of mitigation and of failure to mitigate, not least because there are other ecological constraints to the continued growth that he projects into the future. In fact, in between giving this paper at the IEM conference and editing it for print, Nick Stern has come out revising his economic cost estimate upwards.

But whether or not you believe his estimates, his report is important because it legitimises actions at a strategic, macro level, which will become part of the core agenda for political leaders in this century.

This is great. We will see carbon costing develop, it will inform both public and private sector decision-making and a genuine public politics, deeper than the current bar-room chat about climate and broader than the rather dry, technical nature of current policy making, will have to follow.

But 'Greatest market failure'? No. There are others, which I don't see any hope of bringing to light in the same way using our current economic models.

Can we see how to answer the simple question 'How much wild does a world of nine billion human beings need?' any time soon in a way that will be really useful for policy making? Or 'What lifestyle do we aspire to in the long run, and what global population does that support?'

It's too complicated. Economics is the stuff which our political elite are trained in. We are retrofitting the mainstream model with regulatory prohibitions (e.g. on CFCs) of doubtful enforcement, market interventions (cap-and-trade) of limited scope, product information which most consumers don't notice. This is not the way to enable political leaders to deal with humanity's most pressing issue.

And I'm not just talking about the big

macro-economic choices.

Because we don't yet have the right political context, smaller decisions are also more difficult than we can afford them to be. The upcoming decision on the Severn Barrage is an instructive case in point. I think the key consideration for the decision-makers will be the energy economics, although there is also sharp political pressure arising from our political undertaking on the renewables target. It will be hard enough to get the energy cost-benefit calculations right but the future cost of carbon makes this proposal much more likely to be agreed in contrast to previous attempts.

But how to deal with the other issues? In particular, how to deal with the ecosystem impacts? In today's world, the valuation methodologies rest on rather thin foundations and the argument will therefore be about legal and treaty obligations and whether they can be circumvented or somehow managed. Treaty obligations which exist precisely because we have taken the view that certain natural assets, not expressible in monetary terms, should be essentially outside the realm of monetary negotiation.

This is wise in our current circumstances

but too limited to be an intelligent systematic way of making decisions about our management of our niche. It also succeeds in setting economic and ecological arguments against each other, and therefore makes their proponents less likely to value the other's insights; surely the most stupid position to take given the nature of our predicament.

We need, and quickly, a fusion of the disciplines. The transactions and flows of the economy take place within the real world of human ecology and its flows of resource which are partly created, largely mediated by life itself, by the biosphere.

Presenting economic decisions outside of this context is now inadequate. The challenge to both economists and ecologists is to develop models of thinking about human activity which embed economic analysis within a realistic understanding of the natural systems on which the economy is constructed.

I've often said that economics needs to learn how to think in an ecological way, to understand better the interdependencies and feedbacks in the complex systems within which we have our niche, and if it is rather unfair on the

economists, who after all do understand quite a bit about multivariate complexity, it's a fact that their systems interpret all of that complexity against a univariate monetary scale.

And if you think that ecology will get off scot free, well, sorry. Our challenge - your challenge - is precisely to develop that system-wide thinking into something that can be used effectively in creating big policy.

Not species-level conservation (though that's important), not endless elaboration of how to measure the value of a river system in a way that will stand up in court (it never does), but how our species can use its intelligence to understand and manage its ecological niche on this planet, and to present that knowledge in a way that will help decision-makers make the right decisions.

If we are honest about it, no-one I know wanted to be an ecologist in order to get nearer to political decision-making. Well, hard luck.

Because in the 21st century, that's where you are.



## Get ahead with Conservation Ecology and Environmental Change at BU.



The Centre for Conservation Ecology and Environmental Change at BU has a number of postgraduate opportunities available for entry this Autumn. Courses are delivered by experienced conservation ecologists,

remote sensing and GIS specialists, with an emphasis on developing varied, employable, professional capabilities and enhancing the skills of professionals wishing to work in these fields.

- MSc Biodiversity Conservation
- MSc Environmental Informatics
- MSc Environmental Management by research
- MSc GeoInformatics by research.

For detailed course information visit: [www.bournemouth.ac.uk/pgenvironment](http://www.bournemouth.ac.uk/pgenvironment)

To find out more, contact **askBU Enquiry Service** on

**Tel: +44 (0)1202 961916 Email: [askBUenquiries@bournemouth.ac.uk](mailto:askBUenquiries@bournemouth.ac.uk)**

# Institute News

## Notice of AGM

The Institute's AGM will be held this year as normal during the Autumn Conference. The venue is the Quality Hotel, Glasgow, on 19 November 2008 at 17.30. All members are entitled and welcome to attend regardless of whether or not they have also signed up as a delegate to the Conference.

## Nominations for Council and the Committees

There are currently vacancies on all the Committees and volunteers, especially from Ireland, Scotland and Wales, would be welcome, particularly for the Membership Admissions Committee. Now is the time to consider whether you might like to stand for Council as well, as any nominations need to be voted on at the AGM.

## Are You Feeling Depressed?

There is much talk of a financial slow down and how this may be affecting development projects, especially in the building and construction industry. The Secretariat would welcome any feedback on whether this is affecting the volume of work available for ecologists as this could have clear effects for the profession and implications for whether we can expect our membership growth to continue at the same very high rate.

## Consultations

IEEM has responded to four consultations since the last edition of *In Practice*:

- Draft Marine Bill (Defra);
- Draft Soil Strategy for England (Defra);
- Draft regulations and guidance implementing the Environmental Liability Directive 2004/35/EC with regard to the prevention and remedying of environmental damage (Defra); and
- Higher Education At Work – High Skills: High Value (DIUS).

Forthcoming consultations and past responses can be found at [www.ieem.net/members.asp](http://www.ieem.net/members.asp). If you would like to suggest a consultation that IEEM should respond to, or offer to help with a response, please contact Jason Reeves ([jasonreeves@ieem.net](mailto:jasonreeves@ieem.net)).

## Staff Changes

IEEM is pleased to welcome **Mimoza Nushi** as our first Marketing and Public Relations Officer. Mimoza will take on the organization of events and activities as well as the more commercial aspects of IEEM. Mimoza has a BA in International Business and Management from the School of Economic and Business Studies in Amsterdam. Her appointment will give more capacity for External Affairs to concentrate on policy and influencing the environmental agenda.

Although only with IEEM for a month, **Neal Barton** has been updating the *Sources of Survey Methods* as a special project. This is a considerable body of useful information and will much expand and improve the current web-based resource.

## Membership Fees

Members will have already been advised of the modest rise in membership fees and the information in the notice already sent out explained why this is necessary and how this fits into the increased services being provided by the Institute.

## IEEM Conferences – Online Bookings

As part of developing IEEM's web facilities we are pleased to announce that all conference bookings are now done online, including the Autumn Conference in Glasgow. This facility will be extended to other areas such as the workshops in due course.

## 2009 Spring Conference

The theme of the 2009 Spring Conference will be 'wildlife crime and its implications'. Offers of papers for the conference are welcome. Please contact Nick Jackson ([nickjackson@ieem.net](mailto:nickjackson@ieem.net)) for further information.

## How Are Your CPD Records?

It's time for the annual return of your CPD record – with your membership renewal please. The IEEM scheme is a simple one but it does at least encourage keeping up to date with skills and fulfils one of the basic criteria of being a professional. In summary, the requirement is for 20 hours of CPD per year in total – not much. This should consist of at least 10 hours structured work – attending a course, conference, workshop, etc. and 10 hours unstructured where you might be reading up on a new process, even reading *In Practice* or going on an informal guided walk.

## Second EcIA Practitioners' Seminar, in Scotland?

A practitioners' seminar on the *Guidelines for Ecological Impact Assessment in the UK* is proposed, prior to the Annual Conference in Glasgow on Tuesday, 18 November 2008. If there is enough interest in the event it will go ahead. To show your interest or to find out more please contact Gemma Langdon-Saunders ([gemmalangdon-saunders@ieem.net](mailto:gemmalangdon-saunders@ieem.net)).

## Species Licencing

IEEM held a meeting in May with species specialists and the UK statutory conservation agencies to discuss the possible development of guidance on the skills, knowledge and practical experience required by individuals to gain a species licence. The Professional Affairs Committee will lead on the development of the necessary criteria and guidance.

## Horizon Gazing

Readers of the *In the Journals* section may notice the paper on Horizon Scanning with William Sutherland as the primary author (page 40). The exercise leading to the paper was linked to needs for research, but it would also be interesting to learn from IEEM members what their views are on the issues that we are likely to face, perhaps more in terms of policy and practice. Please let us know if this would be something worth exploring further.

## Professor A D Bradshaw FRS FIEEM

It is with deep regret that we have learnt that Tony Bradshaw passed away on Thursday, 22 August 2008. He was a major driving force behind the creation of IEEM and its first President. He will be sorely missed by a great number of friends and colleagues and our sympathies go out to his family at this sad time.

# North East England Section News

## The North East AGM and Looking Ahead to 2009

**With our AGM fast approaching (17 September 2008) we can report that this was another very successful year for the NE Section with a large membership and a lively programme of events on key topics of interest to our members. The programme of events, which is the core business of the Section, included four field events and four evening seminars. Events over the last 12 months were:**

- The professional challenges raised by the Water Framework Directive (presented by Martyn Kelly CEnv FIEEM, Bowburn Consultants, at the AGM)
- Restoration of upland peat landscapes (Paul Leadbitter, North Pennines AONB Partnership)
- Clients, contractors and the courts – a cautionary tale (Caroline Gettinby CEnv MIEEM, Entec)
- Natural England's national strategy (Prof David Hill CEnv FIEEM, Natural England Board of Governors)
- Managed coastal realignment on the Northumberland coast: flood control and habitat creation (Maria Hardy CEnv MIEEM, Environment Agency; Steve Pullan CEnv MIEEM, Natural England; George Dodds CEnv MIEEM, FWAG).
- Water vole ecology and survey methods (Kevin O'Hara, Northumberland Wildlife Trust)
- Badger ecology and survey methods (Kevin O'Hara, Northumberland Wildlife Trust)

Total attendance at these events approached 200. We are extremely grateful to the speakers and organisations for their contributions, along with the following organisations who hosted events: Environment Agency, National Trust, Northumberland National Park Authority, Northumberland Wildlife Trust, and Durham Wildlife Trust. The range of bodies involved in the Section's events programme truly reflects the extent to which IEEM has become embedded in the region's ecological landscape and augers well for the continued growth and success of IEEM in the North East.

Planning for the year ahead is under way. The programme of events from September is beginning to take shape and includes:

- 17 September 2008: Section AGM and talk on the ecological effects of climate change (see details below)
- 6 November 2008: One-day conference on freshwater ecology (hosted by the Environment Agency; please contact jim.heslop@environment-agency.gov.uk with offers of assistance and for further details)
- 10 November 2008: A meeting focussing on the issues of data sharing and regional records centres with Naomi Hewitt of the EYE project (<http://www.eyeproject.org.uk>)
- December 2008: Species re-introduction seminar
- January 2009: Presentation and discussion on the National Biodiversity Network (NBN) by staff from the NBN team
- February 2009: Talk on the ecology and habitat management for native crayfish

- March 2009: Meeting on the impacts of climate change on the distribution of breeding birds with Prof Brian Huntley of Durham University
- April 2009: Possible regional conference (topic to be confirmed)
- May 2009: Social event and field trip to the Farne Islands
- June/July 2009: Two field meetings each reviewing the success of mitigation measures implemented some years previously

Further details of these events will be posted on the Section's webpage as they become available. Members are urged to bookmark the webpage ([www.ieem.net/nesection.asp](http://www.ieem.net/nesection.asp)) and check it regularly. It is becoming necessary to ask for reservations for our events, particularly for those in the field.

The year's programme begins with the Section's AGM on 17 September 2008 at the Centre for Life in Newcastle upon Tyne. The evening will begin at 6.30 pm and features a talk by Tim Sparks of the UK Phenology Network and Centre for Ecology and Hydrology. Tim will discuss empirical evidence showing the effects of climatic warming on the timing of easily observed natural history events such as the earliest recorded cuckoo song, leaf growth, nesting birds and appearance of butterflies. In some cases records extend over decades and even several hundred years (see <http://www.phenology.org.uk> for more information).

At the time of writing, I am pleased to report that the current members of the Section's Committee have confirmed their intention of standing again at the AGM. Over the last year the Committee has comprised (in alphabetical order):

Steve Betts MIEEM (Treasurer);  
Ian Bond CEnv MIEEM (Secretary);  
David Feige CEnv MIEEM;  
Caroline Gettinby CEnv MIEEM;  
Dorian Latham CEnv MIEEM;  
Tony Martin MIEEM;  
Jonathan Mullard MIEEM (Vice Convenor); and  
Glen Robson CEnv MIEEM.

Tony and Dorian joined mid way through the year; Dorian relocating to the North East after having previously served on the North West Section's Committee. On behalf of the members I would like to thank them for their continued efforts in organising events and promoting IEEM in the region.

In the year ahead we will be looking to expand the membership of the Committee by creating a designated position for a Student or Graduate member. Of course, new members to the Committee, of any level of experience, are always very welcome – so don't be shy, please volunteer and put yourselves forward. Likewise ideas for events, particularly if accompanied by an offer to act as a facilitator, are always most welcome!

For more information on the Section please contact andrew.cherrill@sunderland.ac.uk.

*Andrew Cherrill CEnv MIEEM  
Convenor, North East England Geographic  
Section*

# East Midlands Section News

The East Midlands Shadow Section is planning a Section meeting for October 2008. Discussions will centre on the East Midlands Growth Point and Spatial Strategy, particularly the challenges and opportunities this presents for ecology and consideration of what good planning (including green infrastructure) will look like to a range of stakeholders. We are aiming to have representation from the public and private sectors. Further information will be added to the Section's webpage ([www.ieem.net/emidlands.asp](http://www.ieem.net/emidlands.asp)) as the programme develops. For further information, or if you wish to contribute, please contact Ryan Mellor ([ryan\\_mellor@urscorp.com](mailto:ryan_mellor@urscorp.com)).

*Ryan Mellor CEnv MIEEM*  
*Convenor, East Midlands Shadow Geographic Section*

# South West England Section News

The South West England Shadow Geographic Section will be holding its first Annual Conference on Thursday, 25 September 2008. The theme of the conference is 'Biodiversity Gain In Development' and will be held at the University of Exeter. The programme is available on the Section's webpage ([www.ieem.net/swsection.asp](http://www.ieem.net/swsection.asp)), along with a link to the online booking form. For more information please contact Matt Jones ([mattj@eadconsult.co.uk](mailto:mattj@eadconsult.co.uk)).

*Matt Jones CEnv MIEEM*  
*Convenor, South West England Shadow Geographic Section*



**TAMAR**  
 CONSULTING

## **Environmental Consultancy Manager, Tamar Consulting**

Tamar Consulting is a multi-disciplinary environmental consultancy providing professional services for public and private sector clients. The Consultancy advises on all aspects of terrestrial and aquatic ecology and protected species monitoring and licensing. The consultancy also delivers agricultural and agronomic advice to landowners. The consultancy is wholly owned by the Westcountry Rivers Trust and annually covenants profits to the Trust.

The consultancy requires an experienced Consultancy Manager to lead and grow the business over the coming years.

Ideally with a post-graduate qualification in environmental management or related subject the selected candidate will have extensive experience managing ecological projects and personnel.

Duties will involve the daily running of the consultancy, project management, marketing and successful tendering for work on a local and national scale. Managerial duties will incorporate assessing performance, budget and quality of projects and staff.

The successful candidate will demonstrate a good understanding of environmental legislation and its practical applications to projects and planning. An understanding of the current EIA guidelines and surveying standards are also required. Experience developing relationships with external clients and an awareness of development requirements for the consultancy is highly desirable.

The post would be ideally suited to an ecologist with experience managing a small team to deliver an annual turnover target. The Consultancy is an exciting place to work and the post represents an excellent opportunity for the right candidate.

## **Details**

Pay circa £35 000

Package includes training, pension and life assurance

Partial home working negotiable

Location: Tamar Consulting, Rain-Charm House, Kyl Cober Parc, Stoke Climsland, Callington, Cornwall, PL17 8PH, UK

How to apply: CV and covering letter to Dr Dylan Bright; address as above

Closing date: 1<sup>st</sup> November 2008

# Partnership News

## Society for the Environment

The Society held its AGM on 18 June 2008, which was attended by nearly all the constituent bodies, of which there are now 24. IEEM was represented by Eirene Williams and Jim Thompson. The key positions of overall Chairman and Chairman of the Management Committee will continue to be Tim Boldero and John Gregory respectively.

Following the AGM there was a Chairman's reception at which the guest speaker was Colin Challen MP. He is Chairman of the Cross Party Climate Change Group and is a passionate believer in the need to address global warming issues. He urged members of the society to 'be political' – in other words to make the views of SocEnv heard in political circles.

The Society for the Environment also celebrated the 5,000th Chartered Environmentalist, which just goes to show just how much the Society has achieved in terms of support since its inception just a few years ago. The 5,000th Chartered Environmentalist was Stephanie McGibbon who manages Environmental Impact Assessments for ARUP.

We are also pleased to report that the Society for the Environment has appointed Kerry Geldart as Acting CEO pending the advertising of the permanent post very shortly.

[www.socenv.org.uk](http://www.socenv.org.uk)

## European Federation of Associations of Environmental Professionals

EFAEP is beginning to make inroads into the Brussels jungle with a recent meeting with Ladislav Miko of DG Environment – also a speaker at our conference last year in Nottingham. We have also made contact with Stavros Dimas the Commissioner for the Environment and he is expected to address (remotely) the forthcoming conference and General Assembly.

The theme of the Conference is 'Biofuels: Threat or Opportunity?', which will be very interesting as the broad range of expertise within EFAEP will allow many aspects to be explored.

The General Assembly itself, really an AGM, will deal with the routine affairs of EFAEP. It will report that at long last there is a new Constitution – an AISBL (Association internationale sans but lucratif) under Belgian law, which has some similarities with gaining a Royal Charter. It is also expected to approve new byelaws and to receive the accounts for 2007 and approve the budget for 2009.

The new website for EFAEP is expected to be complete by mid

September and will be a key element in taking EFAEP forward. You can still visit the current website ([www.efaep.org](http://www.efaep.org)) or you can get information from Jason Reeves, the EFAEP Co-ordinator at [coordinator@efaep.org](mailto:coordinator@efaep.org).

The last edition of *In Practice* referred to ENEP - the new European Network for Environmental Professionals - it may well be worth you signing up for this - and, as an IEEM member, there is no cost.

[www.efaep.org](http://www.efaep.org) / [www.environmentalprofessionals.eu](http://www.environmentalprofessionals.eu)

## IUCN - The World Conservation Union

There is not really much to report on the IUCN front except to say that the arrangements for the World Conservation Congress in Barcelona in October 2008 are coming together. IEEM will be hosting a Knowledge Café on Skills and a combined workshop on Professionalism and Ecological Impact Assessment. Our stand is now confirmed, which we will be sharing with the British Ecological Society. There will be a full report on the Congress in the next edition of *In Practice*. Watch out for reports from the Congress in the national press.

[www.iucn.org](http://www.iucn.org) / [www.iucn-uk.org](http://www.iucn-uk.org)

## Countdown 2010

### Making Our Contribution to 2010

Although IEEM is signed up to the 2010 objective, it can only really help through promotion and branding our various activities. On the other hand there are a great many projects undertaken by our members which may well produce benefits for biodiversity and could be seen as contributing to the 2010 goal. IUCN often remarks that the 2010 objective is widely accepted by the conservation community, even if its goal is unlikely to be reached within the timescale. It is much more important to reach the wider community and a way of doing this might be to badge suitable schemes with the 2010 logo. As far as we know there is just one UK environmental consultancy signed up to 2010 but there is absolutely no reason why any company cannot sign up as a partner - this does not mean joining IUCN, but would enable you to fly the flag for Countdown 2010. For further information visit the Countdown 2010 website.

[www.countdown2010.net](http://www.countdown2010.net)



# In the Journals

Jim Thompson *CEnv MIEEM* and Jason Reeves *AIEEM*

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British Ecological Society

Volume 45 Number 3 of the *Journal of Applied Ecology* has a special profile on pollination and pollinators with a collection of eight papers. It focuses on pollinator diversity and plant–pollinator interactions in natural habitats and agricultural landscapes.

M L Forup *et al.*

## **The restoration of ecological interactions: plant–pollinator networks on ancient and restored heathlands**

*Journal of Applied Ecology* 2008, **45**: 742–752

Using an ecological network approach, the authors compared plant–pollinator interactions on four pairs of restored and ancient heathlands 11 and 14 years following initiation of restoration management. They used the network data to test whether visitation by pollinators had been restored and calculated pollinator importance indices for each insect species on the eight sites. They also compared the robustness of the restored and ancient networks to species loss.

Plant and pollinator communities were established successfully on the restored sites. There was little evidence of movement of pollinators from ancient sites onto adjacent restored sites, although paired sites correlated in pollinator species richness in both years. There was little insect species overlap within each heathland between 2001 and 2004.

A few widespread insect species dominated the communities and were the main pollinators. The most important pollinators were typically honeybees *Apis mellifera*, species of bumblebee *Bombus* spp. and one hoverfly species *Episyrphus balteatus*. The interaction networks were significantly less complex on restored heathlands.

The results indicate that heathland restoration does not have to occur immediately adjacent to ancient heathland for functional pollinator communities to be established and from the management viewpoint, only the most common insect species are of concern.

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F Kohler *et al.*

## **At what spatial scale do high-quality habitats enhance the diversity of forbs and pollinators in intensively farmed landscapes?**

*Journal of Applied Ecology* 2008, **45**: 753–762

Over the last decades, biodiversity in agricultural landscapes has declined drastically. Initiatives to enhance biodiversity, such as agri-environment schemes, often have little effect, especially in intensively farmed landscapes. The effectiveness of conservation management may be improved by scheme implementation near high-quality habitats that can act as a source of species. The authors evaluated up to what distance high-quality habitats (nature reserves and artificially created flower-rich patches) affect the diversity of forbs and pollinators in intensively farmed landscapes of the Netherlands.

They surveyed forbs, inflorescences, bees and hover flies and estimated pollination services in transects along ditch banks extending 300 m from four nature reserves forming small

islands in landscapes dominated by agriculture.

In a separate experiment, they surveyed inflorescences, bees and hover flies in 1,500 m long transects on farmland adjacent to five newly introduced flower-rich patches and in five control transects.

Species density of forbs declined over the first 75 m and species density and abundance of hover flies declined over the first 125 m beyond the nature reserves. Beyond these distances, no further declines were observed. The effects of flower-rich patches were spatially limited. The species density and abundance of bees and hover flies were significantly enhanced in the flower-rich patch, but only the abundance of hover flies was enhanced up to 50 m beyond the patch.

Habitat restoration in intensively used farmland should therefore be implemented preferentially in the immediate vicinity of high-quality habitats. In the short term, newly created flower-rich habitats are no alternative to pre-existing seminatural habitats for the promotion of pollinators on nearby farmland.

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N E Sjödin, J Bengtsson and B Ekbohm

## **The influence of grazing intensity and landscape composition on the diversity and abundance of flower-visiting insects**

*Journal of Applied Ecology* 2008, **45**: 763–772

The loss of semi-natural grasslands in agro-ecosystems has increased the importance of adequate management of remaining grasslands. Recommendations for intensive grazing have been debated because the effects of different management practices may differ between taxa and species. The increased fragmentation of grasslands suggests that the influence of management practices should be studied in a landscape context.

The authors studied four groups of flower visitors, many of which are pollinators, bees (Apoidea), butterflies (Lepidoptera), hoverflies (Syrphidae) and beetles (Coleoptera), in semi-natural grasslands managed at three intensity levels in eight areas in central Sweden. Local characteristics of the grasslands were recorded and landscape diversity was quantified. Vegetation height was correlated with grazing intensity: intensive grazing with the shortest vegetation and abandoned grassland with the tallest.

The insect groups responded differently to grazing intensity. Species richness and abundance differed between management regimes for beetles and hoverflies but not for bees and butterflies.

The effects of local habitat and landscape composition on species richness, abundance and composition differed between groups. Bee diversity responded to both local and landscape factors. Butterflies were mainly affected by local vegetation height and linear elements in the landscape. More species of hoverflies were recorded in tall vegetation and in landscapes with high forest cover. Beetles responded only to local environment characteristics.

The paper demonstrates the importance of studying different insect groups simultaneously when evaluating habitat and landscape qualities for diversity. The results suggest that

planning for conservation of biodiversity at landscape scales may be better than implementing grazing guidelines for individual grasslands. Grazing intensity should vary within or between landscapes to preserve pollinator diversity. Conservation management to encourage flower visitors cannot be generalized to include all groups simultaneously.

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J L Osborne *et al.*

### **Quantifying and comparing bumblebee nest densities in gardens and countryside habitats**

*Journal of Applied Ecology* 2008, **45**: 784-792

Bumblebees provide an important pollination service to both crops and wild plants. Many species have declined in the UK, particularly in arable regions. This paper describes the findings of the National Bumblebee Nest Survey carried out by volunteers in the UK during early summer 2004. The surveyors recorded the presence or absence of bumblebee nests in prescribed areas of gardens, short grassland, long grassland and woodland, and along woodland edge, hedgerows and fence lines. The records allowed estimates of the density of bumblebee nests in each of these habitats to be made for the first time.

Nest densities were high in gardens (36 nests ha<sup>-1</sup>), and linear countryside habitats (fence lines, hedgerows, woodland edge: 20–37 nests ha<sup>-1</sup>), and lower in non-linear countryside habitats (woodland and grassland: 11–15 nests ha<sup>-1</sup>).

Gardens provide an important nesting habitat for bumblebees in the UK. In the countryside, the area occupied by linear features is small compared with that of non-linear features. However, as linear features contain high densities of nests, management options affecting such features may have a disproportionately large effect on bumblebee nesting opportunities. Current farm stewardship schemes in the UK are therefore likely to facilitate bumblebee nesting, because they provide clear guidance and support for 'sympathetic' hedgerow and field margin management.

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M Rundlöf, J Bengtsson and H G Smith

### **Local and landscape effects of organic farming on butterfly species richness and abundance**

*Journal of Applied Ecology* 2008, **45**: 813-820

The authors used organic farming, as a landscape-scale experiment to test whether its effect on butterflies depends on the spatial scale at which it is applied. The study consisted of organically and conventionally managed fields within eight pairs of matched landscapes, differing in the proportion of land under organic management at the landscape scale. Butterflies and their nectar and host-plant resources were surveyed along the fields and adjacent field borders.

Butterfly species richness and abundance were significantly increased by organic farming at the local scale. However, local butterfly species richness was also positively affected by a large proportion of organic farming in the surrounding landscape, independent of the local farming practice. Local and landscape farming practices interacted such that the farming practice within fields had a larger effect on butterfly abundance if surrounded by conventionally rather than organically managed fields. These results could only partly be explained by variation in local availability of nectar and host-plant resources.

The total observed species richness was higher in organically managed landscapes, mainly because of higher within-field

diversity, whereas the between-field diversity tended to be similar in both landscape types.

Butterflies were positively affected by organic farming at a local scale, but the amount of organic farming in the surrounding landscape had either an additive (species richness) or interactive (abundance) effect. The spatial distribution of Agri-Environmental Schemes must be taken into account to maximize their potential to increase farmland biodiversity.

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W J Sutherland *et al.*

### **Future novel threats and opportunities facing UK biodiversity identified by horizon scanning**

*Journal of Applied Ecology* 2008, **45**: 821-833

Horizon scanning is an essential tool for environmental scientists if they are to contribute to the evidence base for Government, its agencies and other decision makers to devise and implement environmental policies. The implication of not foreseeing issues that are foreseeable is illustrated by the contentious responses to genetically modified herbicide-tolerant crops in the UK, and by challenges surrounding biofuels, foot and mouth disease, avian influenza and climate change.

A total of 35 representatives from organizations involved in environmental policy, academia, scientific journalism and horizon scanning were asked to use wide consultation to identify the future novel or step changes in threats to, and opportunities for, biodiversity that might arise in the UK up to 2050, but that had not been important in the recent past. At least 452 people were consulted.

Cases for 195 submitted issues were distributed to all participants for comments and additions. All issues were scored (probability, hazard, novelty and overall score) prior to a 2-day workshop. Shortlisting to 41 issues and then the final 25 issues, together with refinement of these issues, took place at the workshop during another two rounds of discussion and scoring.

There were 25 shortlisted issues assessed as a threat, opportunity and for associated research needs. The list is certainly worth reading.

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D Thiel *et al.*

### **Ski tourism affects habitat use and evokes a physiological stress response in capercaillie *Tetrao urogallus*: a new methodological approach**

*Journal of Applied Ecology* 2008, **45**: 845-853

Human outdoor recreational activities are increasing and have a significant impact on wildlife. Capercaillie *Tetrao urogallus* are suffering serious population declines throughout central Europe. The authors examined the effects of ski tourism on capercaillie habitat use and adrenocortical activity, measured non-invasively in droppings.

During three winters, 2003–06, they radio-tracked 13 capercaillie. In the southern Black Forest in Germany, they sampled 396 droppings of these and additional individuals before and after the start of the ski season. They tested whether the intensity of human winter recreational activities affected home range location and habitat use, and identified those factors influencing the concentration of corticosterone metabolites (CM) in droppings.

Capercaillie used habitats subject to ski tourism. Although the latter did not affect home range location, capercaillie preferred undisturbed forests within their home ranges and avoided areas



with high recreation intensity in the ski season. Faecal CM levels of individuals in areas with low recreation intensity were significantly lower than those in areas with moderate or high recreation intensity during the entire study period.

The authors conclude that ski tourism (and this presumably applies to other forms of human use and recreation) affects both habitat use and endocrine status in capercaillie, with potential negative consequences on body condition and overall fitness.

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O R Jones *et al.*

### **A web resource for the UK's long-term individual-based time-series (LITS) data**

*Journal of Animal Ecology* 2008, **77**: 612-615

This paper describes the setting up of this new web resource and gives examples of the data and how it is managed. The use of such a growing resource could be very useful to practitioners.

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S Bauer *et al.*

### **The consequences of climate-driven stop-over sites changes on migration schedules and fitness of Arctic geese**

*Journal of Animal Ecology* 2008, **77**: 654-660

How climatic changes affect migratory birds remains difficult to predict because birds use multiple sites in a highly interdependent manner. A better understanding of how conditions along the flyway affect migration and ultimately fitness is of paramount interest.

The authors developed a model in which energy expenditure, onset of spring, intake rate and day-to-day stochasticity were varied independently. This was applied to the migration of pink-footed goose *Anser brachyrhynchus* from its wintering grounds in Western Europe to its breeding grounds on Arctic Svalbard.

The model results suggested that the birds follow a risk-averse strategy by avoiding sites with comparatively high energy expenditure or stochasticity levels in favour of sites with highly predictable food supply and low expenditure. Furthermore, the onset of spring on the stop-over sites had the most pronounced effect on staging times while intake rates had surprisingly little effect.

The authors then tested whether observed changes in the onset of spring along the flyway explain the observed changes in migration schedules of pink-footed geese from 1990 to 2004. Model predictions generally agreed well with empirically observed migration patterns, with geese leaving the wintering grounds earlier while considerably extending their staging times in Norway.

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L R Sandeman, N A Yaragina and C T Marshall

### **Factors contributing to inter- and intra-annual variation in condition of cod *Gadus morhua* in the Barents Sea**

*Journal of Animal Ecology* 2008, **77**: 725-734

Relative body condition (the quantity of stored energy) is an important tool in understanding demographic variation and the ability of a population to respond to environmental stressors, varying food availability and competition.

The authors examined causes of variation in the condition of north-east Arctic cod *Gadus morhua* for the period 1967–2004, over annual and monthly timescales. Community dynamics and climate variation were also tested as potential causes.

Temperature was shown to have a positive impact on condition at both inter- and intra-annual timescales. Between years, temperature may affect stock distribution, in particular its overlap with the capelin stock. At shorter timescales it is likely that temperature directly affects the metabolism of the cod.

Within years, the quantity of capelin in cod stomachs positively affected cod condition in the current and the preceding month for cod of all lengths. This indicated a time lag between a change in food consumption and a subsequent change in condition,

The study showed that variation in temperature is a vital determinant of changes in condition, both between and within years and with implications for the effects of climate change.

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M Böhm *et al.*

### **Dynamic interactions among badgers: implications for sociality and disease transmission**

*Journal of Animal Ecology* 2008, **77**: 735-745

Direct interactions between individuals play an important part in the sociality of group-living animals, their mating system and disease transmission. The authors devised a methodology to quantify relative rates of proximity interaction from radio-tracking data and highlight potential asymmetries within the contact network of a moderate-density badger population in the north-east of England.

They analysed radio-tracking data from four contiguous social groups, collected over a three-year period. The movement of individuals in relation to the movement of others, both within and between social groups was assessed also taking account of season, sex, age and sett use pattern of the badgers involved.

Intragroup separation distances were significantly shorter than intergroup separation distances, and interactions between groups were rare. Within groups, individuals interacted with each other more often than expected, and interaction patterns varied significantly with season and sett use pattern. Non-movers (using the main sett for day-resting on > 50% of occasions) interacted more frequently than movers (using an outlier sett for day-resting on > 50% of occasions). Interactions between group members occurred most frequently in winter.

Of close intragroup interactions (< 50 m separation distance), 88.6% were associated with a main sett and only 4.4% with outlier setts. Non-movers interacted significantly more often at the main sett than movers. These results highlight the importance of the main sett to badger sociality. The study suggests that badger social groups are comprised of different subgroups, in this case based on differential sett use patterns. These contacts will affect the way in which diseases are transmitted through a social network.

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M B Soons *et al.*

### **Small seed size increases the potential for dispersal of wetland plants by ducks**

*Journal of Ecology* 2008, **96**: 619-627

Long-distance dispersal (LDD) is important in plants of dynamic and ephemeral habitats. For plants of dynamic wetland habitats, waterfowl are generally considered to be important LDD

vectors. The authors quantified the capacity for dispersal of wetland plants by waterfowl and identified the mechanisms underlying successful dispersal, by comparing the dispersal capacities of a large number of wetland plant species.

They selected 23 common plant species from dynamic wetland habitats and measured their seed characteristics. They fed seeds of all species to mallards *Anas platyrhynchos* and quantified seed gut survival, gut passage speed and subsequent germination. They then used a simple model to calculate seed dispersal distances.

In total, 21 of the 23 species could be dispersed by mallards, with intact seed retrieval and subsequent successful germination of up to 32% of the ingested seeds. The species that pass fastest through the digestive tract of the mallards were retrieved in the greatest numbers (up to 54%) and germinate best (up to 87%). These were the species with the smallest seeds. Seed coat thickness plays only a minor role in determining intact passage through the mallard gut, but determines whether ingestion enhances or reduces germination in comparison to control seeds.

Model calculations estimate that most seeds can be dispersed up to 780 km, and the smallest seeds up to 3,000 km, by mallards during migration and that this is an important dispersal mechanism.

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E Gerber *et al.*

**Exotic invasive knotweeds (*Fallopia* spp.) negatively affect native plant and invertebrate assemblages in European riparian habitats**

*Biological Conservation* 2008, **141**: 646-654

Little is known about the impact of invasive plants on both native vegetation and on different invertebrate feeding guilds at the habitat level, yet studies addressing multiple trophic levels are likely to yield additional insight into how and under which conditions invasive weeds alter ecosystem structures and processes. The authors set out to assess whether plant species richness and invertebrate assemblages in European riparian habitats invaded by exotic knotweeds (*Fallopia* spp.) differed from those found in native grassland- or bush-dominated riparian habitats, both of which are potentially threatened by knotweed invasion. Their findings suggest that riparian habitats invaded by knotweeds support lower numbers of plant species and lower overall abundance and morphospecies richness of invertebrates. Additionally, biomass of invertebrates sampled in grassland- and bush-dominated habitats was almost twice as high as that in *Fallopia*-invaded habitats. The authors concluded that large-scale invasion by exotic *Fallopia* species is likely to seriously affect biodiversity and reduce the quality of riparian ecosystems for amphibians, reptiles, birds and mammals whose diets are largely composed of arthropods.

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I E Måren *et al.*

**Restoration of bracken-invaded *Calluna vulgaris* heathlands: Effects on vegetation dynamics and non-target species**

*Biological Conservation* 2008, **141**: 1032-1042

The coastal heathlands of north-western Europe are endangered habitats of great conservation value and invasion by bracken *Pteridium aquilinum* is a major challenge for conservation and restoration of these heathlands. The herbicide asulam is currently the most widely applied bracken control measure, but increasing focus on organic farming and nature conservation calls for alternative, preferably mechanical, approaches. In a seven-year experiment in western Norway, the authors

investigated efficiencies of the four bracken control measures asulam, Gratil, annual cutting and biannual cutting, in restoring the characteristic heathland vegetation structure and species composition. Asulam resulted in the fastest reduction in cover but cutting proved equally efficient long-term. Community compositions progressed towards desired heathland vegetation, but successional trajectories differed. Asulam had unintended effects on a number of heathland species not predictable by species characteristics or functional groups. Gratil failed to have any long-term effects. The authors concluded that cutting is as efficient as herbicide application in reducing bracken, and more so in restoring northern heathland vegetation over time.

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A M Glover and J D Altringham

**Cave selection and use by swarming bat species**

*Biological Conservation* 2008, **141**: 1493-1504

Caves are an important resource to a large proportion of temperate bat species, primarily as mating and hibernation sites. However, information on bat use exists for only a small fraction of caves in many parts of the temperate world. The authors surveyed the Yorkshire Dales by monitoring autumn swarming (mating) activity at 53 caves using automated echolocation call loggers, followed by trapping. Over 60% of caves surveyed were used by bats, but there was considerable variation in activity. Swarming activity was positively correlated with chamber development and negatively correlated with the amount of water the cave carried: together these two predictors explained 45% of the variance. Entrance orientation and shelter explained a further 10%. Activity was not correlated with entrance size, altitude or connectivity to the nearest summer habitat. All five resident swarming species were caught at most sites: *Myotis brandtii*, *Myotis daubentonii*, *Myotis mystacinus*, *Myotis nattereri* and *Plecotus auritus*. Bat populations and catchment sizes were large, and despite the proximity of other suitable caves, bats showed high fidelity to single sites. The results show that the national importance of these caves has been overlooked. The authors suggest that surveying for swarming activity is a quick and effective method of identifying important underground bat sites throughout the temperate world.

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M R Trivedi *et al.*

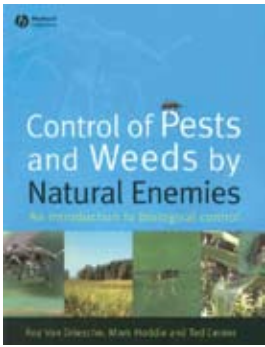
**Potential effects of climate change on plant communities in three montane nature reserves in Scotland, UK**

*Biological Conservation* 2008, **141**: 1665-1675

Mountain ecosystems are often identified as being particularly sensitive to climate change, however this has rarely been investigated at the scale of individual mountain ranges using local relationships between plants and climate. This study used fine resolution data to assess the potential changes to internationally important Arctic-alpine plant communities in three national nature reserves in the Scottish Highlands. Distribution models were created for 31 species, representing a range of community types and a relationship between distribution and temperature was found for all species. These models were aggregated to explore potential future changes to each community under two warming scenarios for the 2080s. The results indicate that Arctic-alpine communities in these reserves could undergo substantial species turnover, even under the lower climate change scenario. The findings highlight the need to maintain these communities in an optimal condition in which they can be most resilient to such change, to monitor them for signals of change and to develop more flexible conservation policies that account for future changes in mountain protected areas.

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# Recent Publications



## Control of Pests and Weeds by Natural Enemies

**Authors:** Roy Van Driesche, Mark Hoddle and Ted Center  
**ISBN:** 9781405145718

**Available from:** [www.blackwellpublishing.com](http://www.blackwellpublishing.com)  
**Price:** £34.99

Accelerated invasions by insects and spread of weedy non-native plants in the last century have increased the need for the use of biological control and the use of

carefully chosen natural enemies has become a major tool for the protection of natural ecosystems, biodiversity and agricultural and urban environments. This book discusses two major applications of biological control: permanent control of invasive insects and plants at the landscape level; and temporary suppression of both native and exotic pests of farms, tree plantations, and greenhouses. Further information and resources can be found on the Editor's own website at: [www.invasiveforestinsectandweedbiocontrol.info/index.htm](http://www.invasiveforestinsectandweedbiocontrol.info/index.htm).



## New Naturalist Dragonflies

**Authors:** Philip S Corbet and Stephen Brooks

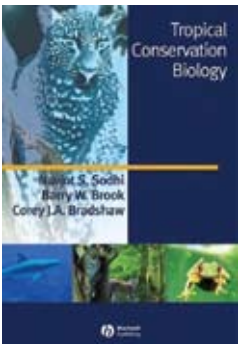
**ISBN:** 978-0007151684

**Available from:** [www.harpercollins.co.uk](http://www.harpercollins.co.uk)

**Price:** £25

This revised work (first published in 1960) examines the behaviour, ecology and distribution of the Odonata in Britain and Ireland, placing emphasis on the insects' habitats and on measures needed to conserve them. The authors

combined knowledge and experience help illuminate the relevance of British species, placing them in the overall context of natural history from a broader, worldwide perspective. Illustrated with beautiful photography, New Naturalist Dragonflies explores all aspects of the biological significance of their behaviour, thus revealing the beauty and hidden complexity of these powerful, agile, flying predators. Sadly, Philip Corbet died this year, shortly after completing this work.



## Tropical Conservation Biology

**Authors:** Navjot Sodhi, Barry Brook and Corey Bradshaw

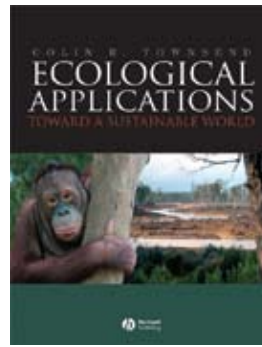
**ISBN:** 9781405150736

**Available from:** [www.blackwellpublishing.com](http://www.blackwellpublishing.com)

**Price:** £29.99

This introductory textbook examines diminishing terrestrial and aquatic habitats in the tropics, covering a broad range of topics including: the fate of the coral reefs; the impact of agriculture, urbanization, and logging

on habitat depletion; and the effects of fire on plants and animal survival. It includes case studies and interviews with prominent conservation scientists to help explain key concepts in a real world context. It also emphasizes the need to integrate social issues, such as human hunger, into a tangible conservation plan and documents the current state of the field as it looks for ways to predict future outcomes and lessen the human impact.



## Ecological Applications: Toward a Sustainable World

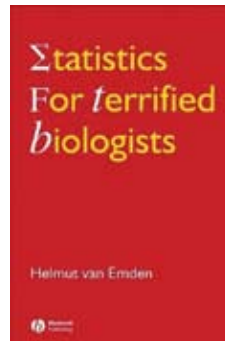
**Author:** Colin Townsend  
**ISBN:** 9781405136983

**Available from:** [www.blackwellpublishing.com](http://www.blackwellpublishing.com)

**Price:** £29.99

This book presents a broad range of methods and techniques for managing environmental sustainability and examines ecological theory at the individual, population, and community levels.

It focuses on ecological applications for sustainability including restoration, conservation, biosecurity, pest control, harvest management, and the design of reserves, and also considers economic and socio-political issues.



## Statistics for Terrified Biologists

**Author:** Helmut van Emden

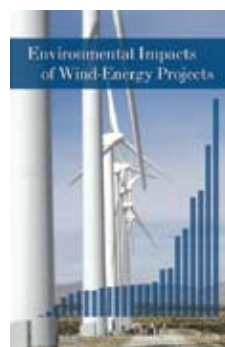
**ISBN:** 978-1405149563

**Available from:** [www.blackwellpublishing.com](http://www.blackwellpublishing.com)

**Price:** £19.99

The typical biology student is 'hardwired' to be wary of any tasks involving the application of mathematics and statistical analyses, but much of biology requires interpretation of experimental data through the use of statistical methods. This textbook

aims to demystify statistical formulae for the average biology student. Written in an engaging style, it draws on the author's 30 years of lecturing experience. One of the foremost entomologists of his generation, van Emden has an extensive track record for successfully teaching statistical methods. Basic methods are presented using straightforward, jargon-free language and students are taught to use simple formulae to accurately interpret what is being measured with each test and statistic, while at the same time learning to recognize overall patterns and guiding principles. Complemented by simple illustrations and useful case studies, this is an ideal statistics resource tool for biology and environmental science students who lack confidence in their mathematical abilities.



## Environmental Impacts of Wind-Energy Projects

**Author:** National Research Council

**ISBN:** 978-0309108348

**Available from:** [www.nap.edu](http://www.nap.edu)

**Price:** £41.99

Although the use of wind energy to generate electricity is increasing rapidly in the United States, government guidance to help communities and developers evaluate and plan proposed wind-energy projects is lacking.

This book offers an analysis of the environmental benefits and drawbacks of wind energy, along with an evaluation guide to aid decision-making about projects. It has an entire chapter dedicated to the 'Ecological Effects of Wind-Energy Development' that focuses primarily on birds and bats. Although focused on the United States, much of the information in this book is applicable to other parts of the world.

# News in Brief

## New Hope for Threatened Bug Haven

Royal Mail has confirmed to Buglife - the Invertebrate Conservation Trust - that it has formally abandoned plans to build on West Thurrock Marshes, a fantastic haven for endangered invertebrates near the Thames crossing at Dartford. Buglife is, however, fearful that another occupier for the site will come forward and has been granted an Appeal hearing to challenge the High Court decision to uphold the planning permission. The Appeal will be heard in November 2008, as long as the Protective Cost Order that protects the small charity from facing crushing legal fees if it loses, is maintained. Buglife has led the two-year campaign to save West Thurrock Marshes.

## Decision Not to Cull Badgers in England Flawed?

The Environment, Food and Rural Affairs Select Committee has accused the Government of 'playing down the seriousness of the nature of cattle TB'. Ministers recently decided against introducing a mass cull policy and Environment Secretary Hilary Benn said that a cull was impractical and publicly unacceptable. Instead, he said the disease should be controlled through better surveillance and biosecurity and stated that there would be more money for the development of a vaccine. The Environment Select Committee, however, has said that this response will not be 'good enough' and will do little to tackle the disease in the next few years. The MPs' report concludes that 'there is little in the Government's strategy, beyond the current policy of surveillance, testing and slaughter, to tackle the disease in the short-term'. The committee recommended earlier this year that the Government should adopt a multi-faceted approach to tackling the spread of TB in cattle. The committee felt that badger culling could make a contribution under certain well-defined circumstances. IEEM members can find out more on the IEEM position at [www.ieem.net/pastconsultations.asp](http://www.ieem.net/pastconsultations.asp) (Bovine TB and Badger Culling, Letter to EFRA Committee, 20 December 2007).

## Severn Tidal Power Feasibility Study

A list of 10 proposed projects that could provide renewable energy from the tide in the Severn Estuary is being considered by the UK Government. The feasibility study will look in further detail at the 10 schemes and a short list will be published later this year highlighting which preferred proposals could be taken forward for more extensive

research.

The ten options are:

1. Outer Barrage from Minehead to Aberthaw
2. Middle Barrage from Brean Down to Lavernock Point
3. Middle Barrage from Hinkley to Lavernock Point
4. Inner Barrage (Shoots Barrage)
5. Beachley Barrage
6. Tidal Fence proposal
7. Lagoon enclosure on the Welsh grounds (Fleming lagoon)
8. Tidal lagoon concept
9. Tidal reef proposal
10. Severn Lake Scheme

## England's Largest New Continuous Forest

The Woodland Trust is planning to transform 850 acres of Hertfordshire countryside into England's biggest new continuous forest. The £8.5 million scheme will hopefully start planting the first of 600,000 seedlings in late 2008, with large-scale planting underway by autumn 2009. Voles, pygmy shrews and mice are expected to colonise the new forest within months of the first trees going in. These should enable barn owls and other predators to establish themselves. Badger setts have already been found in the area and dozens of other creatures found within 10 km of the site are predicted to flourish in a new protected woodland. These include Daubenton's bats, hares, dormice, great crested newts, slow worms, nightingales, hobbies, lesser spotted woodpeckers and white-letter hairstreak butterflies. The Trust is also hoping to attract species that have not been previously recorded in the area, such as red kites. The Trust has deliberately chosen a site less than 30 miles from the centre of London that can be reached by train and bus. The wood will be criss-crossed by public footpaths and new routes for walkers and cyclists.

## New Exclusion Zone to Protect Marine Wildlife Site

One of the UK's finest marine wildlife sites is set to be protected from damaging scallop-dredging, thanks to the introduction of a 60 square mile exclusion zone in Lyme Bay - the first of its kind on this scale in the UK. The Wildlife Trusts have been campaigning for a 60 square mile exclusion zone around Lyme Bay reefs since concern

was highlighted, in the early 1990s, by divers who observed damage to some areas. Survey work by Devon and Dorset Wildlife Trusts has shown that scallop-dredging is damaging the reefs and that time is running out for their preservation. Lyme Bay is home to around 300 recorded species of plants and animals, including dense populations of the nationally protected pink seafan and the extremely rare sunset coral. As well as a haven for sponges, starfish and coral, the reefs also support a range of seafood animals, including crab, lobster and scallops.

## Absence of Leadership is Damaging Systematics and Taxonomy

Emphasising the fundamental importance of systematic biology to our understanding of the natural world, the House of Lords Science and Technology Committee has called for greater Government leadership to secure the future health of the discipline in the UK. The Committee argues that systematics and taxonomy, the science of describing and identifying organisms, is in critical decline in the UK and that further decline would have serious consequences for the Government's ability to deliver on policy aims such as: conservation of UK biodiversity; understanding ecosystem services analysis; responding effectively to climate change and its effect on wildlife; policing the global trade in endangered species; and identifying emerging diseases and disease surveillance. The Committee calls on the Natural Environment Research Council (NERC) to make a clear statement setting out its approach to funding taxonomy and asks the Research Councils to facilitate more effective dialogue between the users and producers of taxonomic information.

## Threat to Seahorse Habitat

Following repeated sightings of pregnant seahorses off a popular Dorset beach this summer, conservationists are concerned about immediate threats to their habitat. The pregnant males seen in Studland Bay include both spiny and short snouted seahorses. There have also been sightings of all six species of pipefish, close relatives of the seahorse. This hotspot lies in eelgrass meadows in only two metres of water, close to one of Dorset's busiest beaches. Seahorses have recently been added to the list of protected species under the Wildlife and Countryside Act, which prohibits damage to their habitat. The Government's Marine Bill should make effective protection possible by creating marine conservation zones, and

Studland has been highlighted by the Wildlife Trusts as being worthy of such protection.

### Rise in Cornwall's Cetacean Deaths

A recent study by the University of Exeter and Cornwall Wildlife Trust, published in the journal *Biodiversity and Conservation*, has revealed a disturbing rise in the number of whales, dolphins and porpoises found dead on Cornish beaches. The frequency of cetaceans found stranded on beaches in Cornwall has increased, with a sharp rise in the last eight years. The researchers believe this could, in part, be due to more intensive fishing, with common dolphins and harbour porpoises being the worst-affected species. The researchers note that their findings could also suggest that there are more cetaceans now living off the Cornish coast, as a result of climate change bringing some animals further north. Cornwall Wildlife Trust and the University of Exeter are now seeking funding for a new project to conduct further research on cetaceans off Cornwall and to test bycatch mitigation measures.

### Climate Change Causing Early Egg Laying

A report by the British Trust for Ornithology (BTO) has said that many British birds are laying their eggs earlier in the year as a result of climate change. The report said birds were being forced to rapidly adapt their behaviour in order to survive, including altering their nesting and migration patterns and travelling further to find food. Surveying 30,000 nests showed species such as the chaffinch and robin are laying their eggs about a week earlier than they did during the 1960s. A similar pattern has been observed for other species such as blue and great tits and swallows. There are concerns that disruption of the natural patterns in the birds' egg-laying could mean they are out of sync with the emergence of the food sources on which they feed their young, such as caterpillars. In Wales, climate change is affecting the breeding patterns of pied flycatchers living in Welsh oak woodlands. In Scotland, there has been a fall in the breeding success of seabirds such as guillemots, puffins and kittiwakes as warming sea temperatures affect the food chain.

### Wetland Vision for England

The Wetland Vision Partnership, an alliance of conservationists and government agencies, has called for large areas of wetland to be created, protected and restored across England in the next 50 years if the country is to meet the challenges of the future. The 'Wetland Vision' outlines wetland creation and restoration across England

and includes a series of maps showing the loss and fragmentation of the country's wetlands and where opportunities exist to create new ones.

### Japanese Seaweed Found in Scotland

A species of Japanese seaweed that threatens the health of our seas has been discovered off the west coast of Scotland for the first time. The alien species, *Heterosiphonia japonica*, was found in May off the island of Oronsay at the mouth of Loch Sunart between the Ardnamurchan and Morvern peninsulas. The seaweed could affect species of fish and invertebrates. *H. japonica* was first recorded in Europe as recently as 1994, when it was identified in oyster ponds in the Netherlands. It has since been found in oyster farming areas in France and Spain and over a period of about 10 years has spread over much of the Norwegian coast. It is likely that the alien seaweed arrived in Europe either with imported oysters or in the ballast water of ships.

### Biodiversity Surveillance

JNCC has published new information on its website about biodiversity surveillance schemes that have been built up in consultation with a wide range of partner organisations. It includes an easy-to-use database of schemes and their results, an analysis of policy needs, and a review of geographical and taxonomic coverage that identifies important gaps. The information about current surveillance has been used to develop a *UK Terrestrial Biodiversity Surveillance Strategy* for the future. The publication coincides with the launch of the *UK – Environmental Observation Framework (UK-EOF)* which aims to enable the UK to achieve a robust evidence base for understanding the changing natural environment. The *UK Terrestrial Biodiversity Surveillance Strategy* will be developed as part of the UK-EOF, contributing and working to its principles.

### Sea Eagle Chicks Released

Sea eagle chicks from Norway have been released in Scotland and Ireland as part of reintroduction programmes in both countries. Fifteen chicks are to be released on the east coast of Scotland after spending time at a secret location in a Fife forest. In Ireland, a total of



Clouded leopard and cub  
Photo: Dave Rolfe

20 chicks will be released this year in Killarney National Park, Co Kerry. Sea eagles were common in both Scotland and Ireland before being persecuted to extinction.

### Habitat Restoration for Bustards on Canary Islands

LIFE Nature funds have been used to carry out habitat restoration work and scientific research on the Canary Islands that improved the conservation status of the houbara bustard *Chlamydotis undulata fuertaventurae*. Lanzarote and Fuerteventura islands host the only European population of houbara bustards where it is found in the islands' dry grassland steppe habitats. The work was also expected to have positive impacts on other steppe birds like the cream-coloured courser *Cursorius cursor*.

### Sea Trout in Seine Could Show Success of River Clean-Up

For the first time since records began, a healthy-looking sea trout has been discovered in the River Seine. The Parisian public body in charge of cleaning up the river has said that the discovery of the migratory fish is evidence that water quality has improved significantly. The sighting is particularly significant because the trout is highly sensitive to the quality of the water in which it lives. The trout is thought to have swum upstream all the way from the Seine Estuary on the Atlantic coast.

### Clouded Leopard Cubs Born in Kent

Howletts Wild Animal Park has announced the birth of four clouded leopard cubs as part of a breeding programme carried out by the Aspinall Foundation to help the plight of the endangered species. Breeding clouded leopards *Neofelis nebulosa* is especially difficult in captivity but Howletts Wild Animal Park is one of the very few zoos to have been successful in its breeding programme with 30 births at the park since 2003.

# Tauro-Scatology and Policy

**Ever wondered if you've got what it takes to be a policy maker and shape future environmental policy? Can you make tough decisions when the heat is on? This week, Basil O'Saurus, our resident Professor of Tauro-Scatology, has devised a hands-on self-appraisal so that you can see whether or not you measure up. What's the first question, Prof?**

How many fingers am I holding up?

**Three.**

Wrong answer.

**But you are holding up three fingers.**

Exactly. You've broken the first rule of policy making and put all the facts on the table at the first opportunity. Let's try again. This time I'll mention, *sotto voce*, that this proposed piece of legislation is likely to be extremely expensive to implement. Now, let's try again: how many fingers am I holding up?

**An unacceptably high number.**

You're getting the hang of this. Another possible answer is that you need to commission some independent research in order to arrive at a definitive position on digital enumeration. This will take several months to complete and will identify a number of areas that need further investigation. You'll then propose a follow-up project but, as circumstances will have moved on, this will, regrettably, fall too far down the list of priority projects to be funded.

Okay, let's try again. This time, let's assume that word has filtered down that senior management are extremely enthusiastic about a particular initiative and would really appreciate a positive spin. How many fingers am I holding up now?

**The great majority.**

A good answer for two reasons. First, you've obviously caught onto the idea that no-one should let evidence get in the way of a policy that you really want to implement and second because it is, technically, true. We'll find an expert to argue that the thumb isn't really a finger at all. No-one can argue that three out of four fingers isn't the great majority.

**Except those who think that three fingers is an unacceptably high number.**

The naysayers won't even know that it has happened. The great thing about the worldwide web is that we can run a public consultation exercise without ever really consulting the public. We'll put all the documentation onto an obscure corner of a website and, if we're lucky, no-one will notice until it is too late.

**What do we do if we don't actually set the policy, if we're just implementing some EU legislation, for example? Let's imagine how we would manage a situation where it is perfectly obvious that the UK is going to fail some significant criterion that is written into a Directive? This time I'll hold up the fingers and you answer.**

You're holding up one finger.

**No I'm not. I'm holding up three fingers.**

On purely empirical grounds, I can't argue with you. But what I've done here is compare the number of fingers

that you're holding up with a baseline figure that reflects the situation when you aren't holding up any fingers at all.

**In which case I'd be holding up no fingers.**

No. No. No. If I can't see any fingers then I wouldn't have any empirical evidence, would I? So I would have to use sophisticated modelling techniques to derive an estimate of the number of fingers to use in situations when I can't see how many fingers you're holding up. This, however, would require a measure of the uncertainty associated with the estimate. Plus or minus two fingers seems reasonable. And, as we are careful guardians of the public interest, it would be rash to act in situations where we were less than 95% certain of the number of fingers. So we'll use two fingers as our baseline in all situations where I can't see how many fingers you're holding up. Which means that you are only holding up one finger.

**Your logic seems tortuous and convoluted.**

Exactly. Of course, in the interests of transparency and open government, we'll have to publish the rationale but, again, we'll find an obscure corner of a website to do this and, meanwhile, hire a top PR firm to highlight the fact that the UK is fully compliant with the new Directive.

**How will the environment ever improve if our policy makers are acting with such cynicism?**

No-one ever needs to know. We'll cut the monitoring program back to the bone and, that way, we'll never have enough statistical confidence in the data to show anything that we don't want to have to show. We'll then pile the effort into a few high profile cases and let the PR wonks do the rest. Focussing on climate change is a good ruse - no-one expects to see the benefits from remedial actions for years.

**What you're saying in other words is that, as far as the public is concerned, policy makers only ever hold up one finger?**

You've learnt the most important lesson in environmental policy making.

**Most elucidating, Prof. Thanks for your time.**

## ENGLISH-GERMAN, GERMAN-ENGLISH INTERPRETING & TRANSLATING SERVICES

Offered by experienced sci-tech translator and conference interpreter (BSc Environment & Heritage, BA Hons, Member of the Institute of Translation & Interpreting, Graduate member of IEEM) with 30 years experience in a wide range of fields including water research, game biology, ornithology, and now also environmental impact assessments, offers language services in these fields. For fees, conditions and availability contact Brigitte Geddes: [bg@allezweb.co.uk](mailto:bg@allezweb.co.uk) or 01955 605 055.

# New and Prospective Members

## APPLICANTS

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 10 October 2008. 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. IEEM is pleased to welcome applications for Membership from the following:

### APPLICATIONS FOR FULL MEMBERSHIP

Ms Rebecca Barrett, Miss Lesley Brown, Mr Paul Eckersley, Mrs Fiona Lanc, Mr Richard E. Law, Miss Jenny Storey

### APPLICATIONS FOR ASSOCIATE MEMBERSHIP

Mr Piran J. Borlase-Hendry, Miss Lisa Hundt

## ADMISSIONS

IEEM is very pleased to welcome the following new Members:

### FULL MEMBERS

Mr Dominic N. Ash, Mr Robin F. Bain, Dr Petronella J. Billings, Mr Neil Bostock, Mr James Bunyan, Miss Gillian B. Catton, Mr Paul F. Comer, Mr John R. Dobson, Mr Jay S. Doyle, Dr Mary M. Elliott, Dr Peter Foss, Mr Malcolm C. Ginns, Mr Daniel Hardie, Mr Fergus N.G. Henderson, Ms Verina Ingram, Mr Richard Jennings, Mr Gwilym D. Jones, Miss Rebecca Kessock-Philip, Mr Brett Lewis, Dr Emma Long, Mr Roger S. MacNaughton, Dr Fiona Mathews, Mr Frazer MacFarlane, Mrs Rachael S. McFarlane, Ms Anne Murray, Mr Nick O'Brien, Dr Grace O'Donovan, Mr Thomas S. Ormesher, Dr Christopher J. Pendlebury, Mr Jonathan W.H. Pounder, Mr Stewart N. Rampling, Mrs Clare E. Robinson, Miss Hazel Ryan, Mr Mark Tunmore, Mr Gareth J. Wilson, Dr Fiona L. Wood

### ASSOCIATE MEMBERS

Mr Simon C. Allen, Miss Kate Armstrong, Miss Rebecca Barker, Miss Helen D. Bates, Mrs Gwen A. Bennett, Mr Guy Benstead, Miss Elizabeth A. Carabine, Mr Frank Daly, Mr John C. Field, Miss Jennifer Fisher, Mrs Naomi R. Forbes, Miss Stephanie Gadal, Miss Claudia K. Gebhardt, Miss Emily M. Greenall, Dr Samantha Hill, Mr David A. Hope-Thomson, Mr Dyfrig L.P. Hubble, Mr Kenneth J. Lipscomb, Miss Ruth Morton, Mrs Chloe O. O'Hare, Miss Leila Payne, Mr John W. Polley, Mr Ellis J. Selway, Mr Matthew Sullivan, Mr Michael P. Symes, Mr Jonathan J. Taylor, Mr Matthew B. Toogood, Mr David Topliss, Miss Aisling Walsh, Mr David G. Watson, Dr Philippa Wood

### GRADUATE MEMBERS

Mr Timothy D. Aldred, Mr Anthony R. Allcorn, Mr Richard Barnard, Mr Neal A. Barton, Miss Charlotte E. Bell, Miss Rosetta C. Blackman, Miss Laura T.N. Blaker, Miss Lynsey H. Blows, Miss Jane C. Brinkley, Miss Jennifer Butler, Mr John E. Callaghan, Mr Matthew J. Cameron, Miss Annie Carpenter, Ms Rebecca Chaffer, Miss Julia A. Clark, Miss Stephanie Clark, Mr Thomas A.F. Coyne, Mr Robert Davies, Mr Daniel de la Hey, Ms Jenny Dowell, Mr Nathan J. Edmonds, Miss Rachel Finan, Mr Richard A. Finch, Miss Helen L. Fletcher, Miss Lisa Forsyth, Miss Rebecca F. Gallie, Miss Jane Gauvain, Miss Rebecca Gill, Mr Jamie T. Glossop, Miss Ruth Gregory, Miss Beverley D. Harris, Mr Thomas Haynes, Miss Suvi T.J. Heikkinen, Miss Sara J. Hill, Miss Thea Johnstone, Miss Laura M. Jones, Ms Elizabeth Juppenlatz, Miss Niamh Kelly, Miss Victoria Kelly, Miss Emma M. Kewell, Mr Ryan Knight, Ms Sarah L. Lamb, Miss Hannah Leach, Miss Jane Lister, Mr Sean K. Macaulay, Mr Fraser R. Malcolm, Mr James Mullholland, Dr Giselle C. Murison, Miss Róisín Ní Mathúna, Miss Diane Nicolle, Miss Mai S. Nielsen, Miss Nina J. O'Hanlon, Miss Laura Phillips, Miss Laura M. Plenty, Mr Andrew J. Ross, Miss Lorraine Simpson, Miss Caroline R. Smith, Miss Jennifer P. Stillwell, Mr Richard B. Storton, Miss Francesca Tarry, Dr Adora T. Tyler, Mrs Patricia Vaux, Mr Ryan Wilson-Parr, Miss Helen Womack, Mr Edward J. Wood, Miss Victoria L. Woods, Mr Thomas J. Woollam

### AFFILIATE MEMBERS

Miss Jennifer Cairns, Mr John R. Clarkson, Mr David G. Darrell-Lambert, Mr William R. Hayward, Mr Gordon G. Lowe

### STUDENT MEMBERS

Mr David Armson, Mr John W. Bleach, Mr James A. Breen, Mr Philip A. Budd, Mr Jon P. Byrd, Miss Laura Christie, Miss Naomi Collingham, Miss Katherine H. Fraser, Miss Tara Gallagher, Miss Naomi N.J. Green, Mr David I. Hamilton, Mr Mark Haynes, Mr William D. Jackson, Dr Lesley J. Mason, Ms Margaret O'Callaghan, Mr Kevin O'Keefe, Mr Stephen O'Riordan, Mr Mark Ormiston, Miss Faye Palmer, Ms Caroline Renton, Miss Philippa Revill, Mr Joey Talbot, Mr Jonah J. Tosney, Miss Sarah J. Tree, Mr James Tristram, Miss Amy Tyrer

## UPGRADES

The following have successfully upgraded their Membership:

### ASSOCIATE to FULL MEMBERSHIP

Miss Emma N.G. Armitage, Mr John D. Baker, Mr Colin F. Bonfield, Mr William A.P. Brown, Miss Kimberly Dawson, Mr Rafe Dewar, Mr Howard J. Fearn, Mr Thomas A. Flynn, Mr Alastair J. Miller, Miss Jackie Nicholson, Mr Gary Noble, Miss Ellen Partington, Ms Jude Roberts, Dr Fiona Sharpe, Mr Philip J. Smith, Miss Rebecca M. Tarry, Ms Marion H. Thomson

### GRADUATE to ASSOCIATE MEMBERSHIP

Miss Victoria Bennett, Mr Matteo Dei, Miss Victoria Gilbey, Miss Rachael Maskill, Mr Duncan C. McLaughlin, Mr Edward Partridge, Miss Jen Rigney

### AFFILIATE to ASSOCIATE MEMBERSHIP

Miss Annie Porter, Miss Catherine Shields

### STUDENT to GRADUATE MEMBERSHIP

Miss Camilla Burrow, Miss Debbie Cotton

# What's on October - December 2008

## 17 September 2008 IEEM North East England Section AGM

Newcastle upon Tyne  
[www.ieem.net/nesection.asp](http://www.ieem.net/nesection.asp)

## 25 September 2008 IEEM South West England Shadow Section Conference - Biodiversity Gain In Development

Exeter  
[www.ieem.net/swsection.asp](http://www.ieem.net/swsection.asp)

## 5 - 14 October 2008 IUCN World Conservation Congress

Barcelona, Spain  
[www.ieem.net/otherevents.asp](http://www.ieem.net/otherevents.asp)

## 13 October 2008 IEEM Irish Section Conference - Coastal and Marine Environment: Biodiversity, Management and Protection

Oranmore, Galway  
[www.ieem.net/irishsection.asp](http://www.ieem.net/irishsection.asp)

## 13 - 15 October 2008 Grassland Grazing for Wildlife

Peak District National Park  
[www.ieem.net/otherevents.asp](http://www.ieem.net/otherevents.asp)

## 16 October 2008 Darwin and Domestication

Linnean Society, London  
[www.ieem.net/otherevents.asp](http://www.ieem.net/otherevents.asp)

## 21 October 2008 The ENDS Report's European Waste Conference

London  
[www.ieem.net/otherevents.asp](http://www.ieem.net/otherevents.asp)

## 21 October 2008 Soil management for biodiversity

London  
[www.ieem.net/otherevents.asp](http://www.ieem.net/otherevents.asp)

## 22 October 2008 The Longer the Better: A celebration of long-term data sets

Linnean Society, London  
[www.ieem.net/otherevents.asp](http://www.ieem.net/otherevents.asp)

## 23 October 2008 Participation in Marine Decision Making – MPA Networks and Beyond

Exeter  
[www.ieem.net/otherevents.asp](http://www.ieem.net/otherevents.asp)

## 23 - 24 October 2008 Making sustainable tourism a foundation of the rural economy

Belfast  
[www.ieem.net/otherevents.asp](http://www.ieem.net/otherevents.asp)

## 28 - 30 October 2008 The Big Squeeze - Dealing with pressure on our countryside and green space

Lacock, Wiltshire  
[www.ieem.net/otherevents.asp](http://www.ieem.net/otherevents.asp)

## 29 - 31 October 2008 Species Management: Challenges and Solutions for the 21st Century

Edinburgh  
[www.ieem.net/otherevents.asp](http://www.ieem.net/otherevents.asp)

## 4 - 5 November 2008 IEEM Irish Section Event - Green Infrastructure: Connecting Nature, People and Places

Malahide, Ireland  
[www.ieem.net/irishsection.asp](http://www.ieem.net/irishsection.asp)

## 4 - 5 November 2008 Biodiversity: Planning Obligations and the NERC Act 2006

Oxford University Continuing  
Professional Development Centre  
[www.ieem.net/otherevents.asp](http://www.ieem.net/otherevents.asp)

## 6 November 2008 IEEM North East England Section Conference - River Management for Wildlife, Fisheries and People

Newcastle upon Tyne  
[www.ieem.net/conferences.asp](http://www.ieem.net/conferences.asp)

## 6 November 2008 Managing Biodiversity in a Changing Climate

Oxford University Continuing  
Professional Development Centre  
[www.ieem.net/otherevents.asp](http://www.ieem.net/otherevents.asp)

## 6 November 2008 The Global Amphibian Extinction Crisis

Linnean Society, London  
[www.ieem.net/otherevents.asp](http://www.ieem.net/otherevents.asp)

## 10 - 14 November 2008 Wildlife Law

Peak District National Park  
[www.ieem.net/otherevents.asp](http://www.ieem.net/otherevents.asp)

## 18 - 20 November 2008 IEEM Autumn Conference - Mitigation

Glasgow  
[www.ieem.net/conferences.asp](http://www.ieem.net/conferences.asp)

## 27 November 2008 Carbon mitigation, habitat restoration and conservation of diversity

Linnean Society, London  
[www.ieem.net/otherevents.asp](http://www.ieem.net/otherevents.asp)

## 1 - 5 December 2008 Geographic Information Systems 1 and 2

Nottingham Trent University  
[www.ieem.net/otherevents.asp](http://www.ieem.net/otherevents.asp)

## 3 December 2008 Growing up Outdoors Conference

London  
[www.ieem.net/otherevents.asp](http://www.ieem.net/otherevents.asp)

## April 2009 IEEM Spring Conference 2009: Wildlife Crime

Location tbc  
[www.ieem.net/conferences.asp](http://www.ieem.net/conferences.asp)

For IEEM workshops  
please refer to the  
Training Workshop  
Programme, which can  
be found at:

[www.ieem.net/  
workshops.asp](http://www.ieem.net/workshops.asp)

## Centres offering course programmes that might be of interest to IEEM members. Information from:

Centre for Alternative Technology,  
Machynlleth, Powys, SY20 9AZ  
01654 705950  
[www.cat.org.uk](http://www.cat.org.uk)

Field Studies Council, Preston Montford,  
Montford Bridge, Shrewsbury,  
Shropshire, SY4 1HW  
0845 345 4071  
[enquiries@field-studiescouncil.org](mailto:enquiries@field-studiescouncil.org)  
[www.fieldstudiescouncil.org](http://www.fieldstudiescouncil.org)

Freshwater Biological Association, The  
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