Rooting for a Career in Ecology or Environmental Management?

Fourth edition 2007

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This booklet is an updated version of the second edition, published in 2001. The text is available on the British Ecological Society's website – www.britishecologicalsociety.org and www.ieem.net

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The British Ecological Society (BES)

British Ecological Society

The British Ecological Society is a learned society, a registered charity and a company limited by guarantee. Established in 1913 by academics to promote and foster the study of ecology in its widest sense, the Society currently has around 4,000 members spread around the world. They include research scientists, environmental consultants, students, conservationists, teachers, local authority ecologists and many others with an active interest in natural history and the environment. The Society's mission is: to promote the science of ecology worldwide.

To achieve this we:

- support and publish ecological research;
- encourage communication and collaboration among ecologists;
- foster the teaching and learning of ecology; and
- influence policy and practice.

The Society employs full-time and part-time staff at its administrative office in London. In addition, financial support is provided for publication editors working in universities and institutes around the United Kingdom, and a press secretary based in London. The work of the BES is underpinned by the efforts of unpaid Officers and Committee members who determine policy and carry projects forward. The Society publishes four internationally renowned journals and organises at least two major conferences each year plus a large number of smaller meetings. It also initiates a diverse range of activities to promote awareness of ecology at the public and policy-maker level, in addition to developing ecology in the education system, and it provides financial support for approved ecological projects.

A survey of members of the Society revealed the following employment pattern:

- further and higher education – 40%;
- scientific research (excluding members in education) – 29%;
- conservation – 10%;
- agriculture and forestry – 5%;
- secondary education – 2%;
- planning – 2%;
- consultancy – 2%; and
- miscellaneous – 10%.

The Society is funded through income from subscriptions, publications and its investment portfolio. It is an independent organisation, which receives little external funding. The British Ecological Society is an established and progressive learned society promoting excellence in ecological research and education.

More details are available from:

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The Institute of Ecology and Environmental Management (IEEM)

The Institute was founded in September 1991 to provide professional status to the rapidly growing number of ecologists and environmental managers across a broad spectrum of work in the public, voluntary and private sectors. The Institute now has over 3,000 members, drawn from local authorities, government agencies, industry, environmental consultancy, teaching/research, and Non-Governmental Organisations. Membership is open to anyone fulfilling the requirements and full members can work their way towards becoming a Chartered Environmentalist awarded through the Society for the Environment.

The Institute aims to establish, maintain and enhance professional standards within the industry and also to raise the profile of the profession in general. Members are bound by a Code of Professional Conduct, acceptance and adherence to this code is a duty of every member and a condition of membership.

The Institute provides a number of services to its members:

- An annual Professional Development Programme consisting of over 50 practitioner-led workshops, providing ecologists and environmental managers with informal and inexpensive training.
- One and two day conferences where professionals can meet and share their ecological experiences. These events are an invaluable place for networking.
- A wide variety of publications, including:
  - *In Practice*, the Institute's quarterly bulletin;
  - conference proceedings;
  - a Professional Issues Series – guidance documents on particular issues; and
  - a Technical Issues Series, *e.g.* Ecological Impact Assessment Guidelines and Sources of Survey Methods.
- A searchable web-based directory, for those members who want their skills available on a commercial basis. This also provides an invaluable source of contacts for people wanting ecological surveys carried out.
- Making the voice of the Institute heard by responding to government consultations and via links with larger external organisations such as IUCN, EFAEP and SocEnv.

More information is available from:

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Introduction

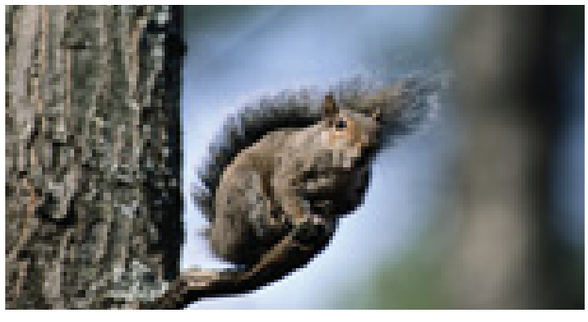
This booklet has been written for people at school and university, to help them decide whether a career in ecology or environmental management is for them. Competition for employment in ecology is intense and the profession demands high levels of commitment, but the rewards that come with this work provide great job satisfaction.

This is a joint publication between the British Ecological Society (BES) and the Institute of Ecology and Environmental Management (IEEM). The two organisations have complementary roles, one in developing and teaching ecological knowledge, the other in its professional application. Together, they embrace the professional needs of ecologists.

Ecology is the branch of biology concerned with the relations of organisms to one another and to their physical surroundings.

So, what makes an ecologist? There are general qualities, such as self motivation, teamwork, computer literacy and communicating and negotiating skills, which are necessary for most areas of work, but special qualities are needed for success in ecological work. These include:

- a fascination for animals and plants;
- a thorough knowledge of the functioning of natural systems;
- good academic qualifications in biological or environmental subjects;
- expertise in one or more groups of living organisms;

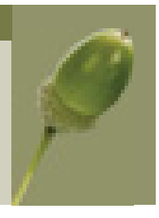


- the facility to infect others with enthusiasm about the natural world;
- enjoyment of fieldwork;
- the staying power needed to complete tedious and sometimes uncomfortable tasks in field or laboratory; and
- an objective approach to conservation issues.

This booklet describes the kind of jobs available in ecology and environmental management, details the qualifications needed, provides guidance on how to go about finding jobs and gives first-hand accounts of the work by practising ecologists.

Did you know?

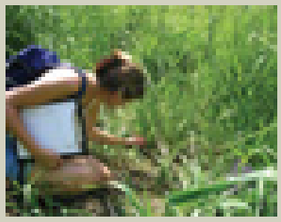
Ecology is derived from the greek word Oikos – meaning house. Oekologie was first coined by Ernst Haecke in 1866.



Hannah Graves

Botanist

Profile



I began my career as a botanist four years ago, volunteering with the local County Wildlife Sites Project. In exchange for helping out with field surveys and report writing, I picked up my first plant identification skills. I was shadowing surveyors with good ID skills so I learnt the 'difficult' groups like grasses and sedges as well as herb species. At the end of several months of volunteering learning a range of conservation skills, I obtained a job with the local Wildlife Trust, working with landowners restoring wetlands.

The wetland area I was working in was an exceptional area of species rich floodplain grassland. A large part of my work was surveying extremely high quality MG4 and MG5 meadows, including some that had never been surveyed before, so my botany skills were improved considerably. Whenever possible I involved local experienced botanists to help with the surveys and was able to learn a lot from them, including how to identify the Red Data Book *Carex vulpina*, which I subsequently found in several previously unknown locations.

In 2004, I enrolled on the University of Birmingham's 'Certificate in Biological Recording and Species Identification' course. I completed six botany modules, all based at Field Studies Council Centres, including the highly useful 'Using a Flora' module which really improved my ability to categorise plants and use keys. I was lucky enough to have a close friend also taking the courses and it helped enormously to have someone to go out and practice with in spare time at home. I also became a member of the Botanical Society for the British Isles (BSBI), which raised awareness of other botany training support and events.

In 2005, I went on several additional training courses covering difficult plant groups including sedges, vegetative grasses, umbellifers and crucifers. I began to teach basic ID skills to volunteers and staff at the Wildlife Trust, which turned out to be an extremely effective way of improving my own skills and knowledge. I also started doing some freelance surveying in my spare time, which introduced me to new habitats and species and improved my recording and reporting skills.

After two years at the Trust I moved on to my current post as Ecologist for British Waterways, South East, where I have now been for over a year. This job is very varied, and I use my botany skills particularly when it comes to canal-side vegetation management. I have developed new skills in aquatic plant ID, and went on the University of Birmingham's 'Aquatic Macrophytes Masterclass' course in 2006, which included a challenging mock Identification Qualification test. Aquatic plant surveys of the canals this year have given me plenty of practice.

I hope to continue to develop my career as a botanist by acquiring skills on groups like bryophytes and charophytes, which are often overlooked by surveyors.

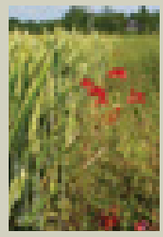
Environmental management is the term used to describe the management of human interaction with the environment.

Tim Rich

Head of Vascular Plants, National Museum of Wales

Profile

After picking up an interest in botany from my Sixth Form Head and watching a David Attenborough documentary, I went to Lancaster University in 1979 to study for a BSc in Ecology. I spent most of my time learning the British flora, because to be a plant ecologist you need to know the plants. After finals, I started work with the Nature Conservancy Council, applying my botanical knowledge to surveying and re-notifying SSSIs. I soon realised that to further my career I needed more qualifications, so in 1983 I went to do a PhD in Plant Physiology at Leicester University. You need the physiology to understand the ecology!



After finishing my PhD, I spent four years organising the Botanical Society of the British Isles (BSBI) Monitoring Scheme, a survey to assess the status of the flora of Britain and Ireland. Then I returned to Lancaster University as a Research Associate working on climate change and air pollution in the newly-established Unit of Vegetation Science. These career moves were not pre-determined, but depended on jobs becoming available at the time.

Personal circumstances intervened, since I wanted to be nearer my girlfriend of the time. I was unable to find a suitable job in London, so in 1992, I took the plunge and set up as a self-employed, specialist, botanical consultant, the most rewarding stage of my career. I worked for a range of clients on environmental impact assessment, rare plant conservation, monitoring and site management. I really enjoyed the hard-nosed, problem solving, directed cut-and-thrust of the commercial world. I also learned so much more than botany, through working with other professionals.

After meeting my wife-to-be, and tired of working on my own, in January 1997, I joined the National Museum of Wales in Cardiff, as Head of Vascular Plants. I am now a dusty museum relict, applying my botanical knowledge to biodiversity and systematic biology!

The Government and Statutory Sector

Many departments and agencies of central and local Government have responsibilities to promote or have regard to the conservation of wildlife, habitats and landscape quality, so they need staff who have a sound knowledge of ecological practice. Employment opportunities in the public sector have been created by European Union environmental policies, the Government's agri-environment programme, which includes schemes to enhance the wildlife value of agricultural land, and the UK's acceptance of the resolutions from the Earth Summit in Rio de Janeiro in 1992. These called for sustainable development, the maintenance of biodiversity and a reduction in emissions to the atmosphere.

Resolutions from Rio are being implemented both at the national level and by local authorities.

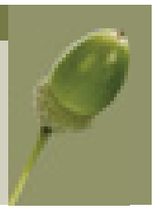
The employers

Government departments and agencies are frequently reorganised, but the major employers at present include:

- the national agencies with a specific statutory remit for wildlife and landscape conservation – Natural England (formed from the amalgamation in October 2006 of English Nature, the Countryside Agency and the Rural Development Service), the Countryside Council for Wales, Scottish Natural Heritage, the Environment and Heritage Service, Northern Ireland, the Joint Nature Conservation Committee;
- other Government agencies such as the Environment Agency (which covers England and Wales), the Scottish Environment Protection Agency (SEPA), the Forestry Authority, Forest Enterprise and British Waterways;

Did you know?

There are around 27,000 invertebrate species in the UK.

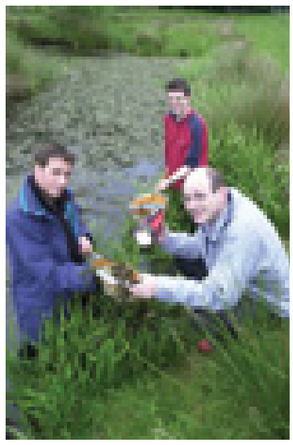


- Government funded research institutes (see chapter on *Science and Research*);
- museums, including the Natural History Museum in London and provincial museums;
- botanic gardens, including the Royal Botanic Gardens at Kew and Edinburgh and the new National Botanic Garden of Wales;
- Government Departments such as the Department for Environment, Food and Rural Affairs;
- local authority planning, environment and leisure and recreation departments; and
- National Park Authorities.

The work

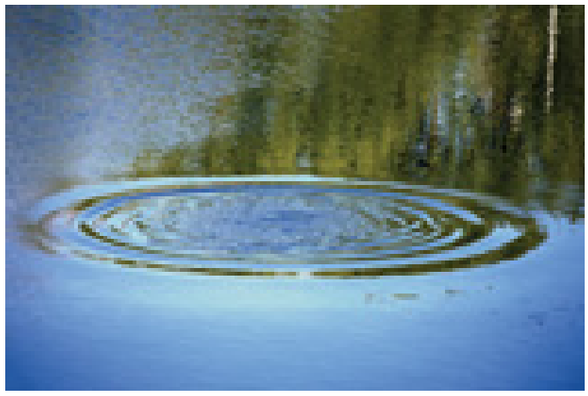
Both permanent and short-term contract work is offered by some of these organisations. A single job, such as that of an area officer in a conservation agency, may involve a wide variety of activities. The main areas of work are listed here.

- *Site safeguard*
  Conservation agency staff are responsible for selecting, designating and safeguarding legally protected areas such as Sites of Special Scientific Interest (SSSIs) and National Nature Reserves.



- *Practical countryside and site management*
  Site managers, rangers and wardens are employed to run national and local nature reserves, country parks and recreation areas. There is an increasingly important relationship between habitat and landscape conservation and the provision and management of public access to designated and protected areas. This provides employment opportunities for footpaths and project officers. Many of these trained as ecologists and, like most rangers or wardens, they perform an educational role as part of their responsibilities.

- *Research*
  Openings for ecologists to work in research are limited, except in the research centres (see chapter on *Science and Research*).



Profile

Katharine Bryan

Chief Executive,
Northern Ireland Water Service

As a child I was always interested in the environment, but I suppose if I have to pinpoint a defining early moment it was a week's work experience with the local sewage treatment works. This helped me decide on a 'green' education path, which finally took me to Durham University to study for a BSc in Botany and Geography and then an MSc in the Biology of Water Management at Aston.

From here it was a natural step into the world of work and to securing a job as a scientific officer with the Severn Trent Water Authority. From an 'on the ground' post with the Fisheries and Recreation Department, I moved to work as a senior scientist on the environmental and conservation aspects of the Authority's work. Tasks varied from providing an advisory service on pesticides to carrying out botanical surveys.

Increasingly, I became interested in how these responsibilities related to other water authority activities and to the managerial side of improving the environment. Three years working in research and development confirmed this career direction. I was therefore really delighted to secure my first senior management position as Regional Manager, Fisheries, Conservation and Recreation for the newly formed National Rivers Authority (NRA). In 1992, I moved on to become a Regional General Manager for the NRA and in 1996 was appointed as the South West Regional Manager for the new Environment Agency.

Although my career returned to the water industry, as Chief Executive of the North of Scotland Water Authority in 2000, and of the Northern Ireland Water Service in 2004, environmental issues are still very much to the fore. The water industry has played a significant part in improving the freshwater and coastal environment in the UK, although in Northern Ireland we have a bit of catching up to do!

Katharine says:

"The environment is a wonderful field to work in and I would encourage anyone involved to find the area of work that gives them the most satisfaction and go for it!"

Simon Leach

Botanical Adviser, Natural England

Profile

My earliest memory: a hot summer's day, sitting on the lawn trying to catch tiny, gold coloured beetles rushing about through the grass. Nature was there to be collected – birds' eggs, butterflies, fossils, conkers. Being a collector was what made me an ecologist. After all, if you want to collect something you have to know where to look for it, so you need to appreciate that each plant or animal has its own particular habitat.

In my early teens I was a bird-watcher. Enthusiasm for botany came later, thanks to a teacher who thought the best place to learn about plants was in the field. I did A-level Botany, Zoology and Geography, then had a 'gap year', including six months with the Institute of Terrestrial Ecology, Monks Wood. There I acted as a 'dog's-body', collecting and sorting insect samples.

A degree in Natural Environmental Science with Landscape Studies at Sheffield was followed by a job creation scheme, doing vegetation surveys in Pembrokeshire. In 1979, I obtained a permanent position in the Nature Conservancy Council (NCC) as Assistant Regional Officer in Fife, where much of my time was spent safeguarding sites and writing reserve management plans. This was followed by two years as leader of a field survey team for the Department of Environment Northern Ireland. Then back to NCC's England Field Unit as a botanist. In 1991, I became English Nature's Survey and Monitoring Officer in Taunton. In 1994, this job disappeared, but I found my niche in the English Nature team working on rare and threatened plants.

I have contributed substantially to the *New Atlas of the British and Irish Flora* (2002) and the *Vascular Plant Red Data List* (2005). I am an active member of the Botanical Society of the British Isles (BSBI) and the Somerset Rare Plants Group, and a recorder for the UK Phenology Network and the British Trust for Ornithology (BTO) Garden Birdwatch scheme.

In 1990, I went part-time, an unusual step for a bloke, but one which allowed me to embark on my second career – being a parent! 'Being Dad' continues to take up a surprising amount of time. Both my boys are keen cricketers, so a fair amount of the 'field season' is spent on the boundary ropes. But plant-spotting is an obsession, and there are botanical gems to be had, even on the square leg boundary – bulbous meadow-grass, chamomile and clustered clover, to name but three.....

Because much of the research carried out by Government departments and their agencies is done under contract, staff often spend time administering contracts rather than carrying out research themselves.

Field survey work

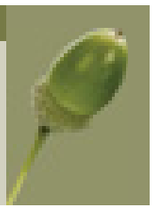
A large amount of field survey work is carried out by Government agencies, research institutes and local authorities. The Environment Agency and the Scottish Environment Protection Agency, for example, employ ecologists to carry out monitoring (*e.g.* of pollution and river quality). Some survey work is carried out by permanent staff and there is a large, albeit irregular or cyclical demand for field staff for short-term contract work.

Providing advice

Much of the work of statutory agency and local authority staff is concerned with giving advice to Government, land owners and the general public on topics such as nature conservation strategies, wildlife legislation, site management, species protection, urban and rural development and even pest control. Some advice is in the form of publications. Government seeks advice from the statutory agencies to help it develop policy and legislation affecting the environment. Project officers responsible for co-ordinating environmental projects are often employed by local authorities. Ecologists are required to work closely with engineers, planners, landscape designers and estate management colleagues. The greater emphasis now placed on environmentally sensitive forms of farming and forestry has opened up advisory roles for ecologists, for instance in agri-environment schemes involving the reversion of arable land to chalk downland or heathland.

Did you know?

There are only 60 mammal species in the UK with a further 18 visiting our seas.



International work

For senior staff in the statutory sector there are opportunities to represent the United Kingdom at international conferences and in specialist meetings of organisations such as the European Union and the Council of Europe.

Qualifications and qualities

Scientific positions are available for graduates or people with post-graduate qualifications in biological or environmental subjects. Increasingly, site managers and rangers, as well as scientists, hold degrees or similar qualifications. However, there are clerical and administrative jobs available in these organisations for people who wish to be associated with environmental work and who have the required GCSE (Standard Grade in Scotland) or A-level (Higher in Scotland) qualifications.

Increasing seniority requires management skills and a willingness to relinquish specialisms for more supervisory roles. Within the statutory sector there are sometimes opportunities for gaining experience through periods of secondment.

Posts are highly contested. You will have a much better chance of finding a job if you have proved your worth by working previously as a volunteer, for instance for a Wildlife Trust or the RSPB.

VOLUNTEERING:

Get experience through weekend, vocational or seasonal jobs whilst at university. It will give you a head start in finding paid posts once you have graduated.

Profile

Andy Parfitt

Sites Manager, Hampshire County Council Countryside Service

I grew up in rural Somerset, spending most of my spare time helping out on a friend's family farm. Early formative experiences included being involved in rough shoots. This form of involvement with the countryside engendered a close relationship with wildlife, but I soon came to the conclusion that I required a more satisfying and positive interaction.

I obtained A-levels in biology, chemistry and pure maths, but was uncertain which direction I wished to follow and initially toyed with the idea of pursuing a career in marine biology. For 15 months following school, I worked as a farm labourer and enjoyed the physical and varied nature of the role. In 1974, I went to the University of Edinburgh to take a BSc in Ecological Sciences with Honours in Wildlife and Fisheries Management, principally because it had a more applied bias than most courses offered at the time. I developed a more profound interest in ecology and natural history during the course.

A vacation job as a water bailiff in Sutherland provided an outlet for a common thread, which runs through my career, namely that I need involvement at a hands-on level. After graduating, I moved onto a series of short-term contracts, including carrying out a survey of fish in the catchment of the River Tweed, working as a countryside ranger in Edinburgh, doing a survey of Dutch elm disease and wardening on the Isle of Rhum. I moved south in 1978 to carry out research on fallow deer in the New Forest, but decided that what I most wanted to do was to become a warden, which would enable me to be in close day-to-day contact with habitats and wildlife.

During a period of unemployment I became a volunteer nature reserve warden, and in 1987, I took up employment with Hampshire County Council as a countryside ranger. After eighteen months I moved to the post of Senior Naturalist Ranger and in 1992, I took up my present post. I am responsible for the management of eight sites, including one National Nature Reserve and three Local Nature Reserves. I manage a team of three and much of my time is spent planning work, controlling budgets, managing Health and Safety and liaising with other organisations or individuals. Although my role is more office-based than I would ideally like, its varied nature and the new challenges it presents retain my enthusiasm and interest.

Business and Industry

Most industries have some effect on the natural environment. The intensity of the impact depends on the nature of the resources utilised, the manufacturing processes used and waste produced. Environmental action by industry is largely driven by legislation on pollution and the requirement for environmental impact assessment in the planning stage of developments. Many of the potentially or actually harmful activities of manufacturing industries are monitored by the Environment Agency and the Scottish Environment Protection Agency.

The employers

Industries and businesses that provide the greatest scope for employing ecologists deal with:

- mineral extraction;
- growing and processing food or timber;
- production and supply of energy;
- abstraction and supply of water;
- collection, processing and disposal of waste;
- the pest control industry;
- civil engineering;
- landscaping and gardening;
- provision of out-door leisure facilities and pursuits; and
- holidays and tourism.

The work

Most of the scientific and technical work in industry is for chemists and engineers, but there is some scope for ecologists. Opportunities for direct employment by manufacturing firms and businesses are limited, as much of the environmental work is done by consultants under contract. However, some companies do employ in-house ecologists and environmental managers. There may be opportunities for work abroad, or instance on large civil engineering projects. The following are examples of the areas of work available.

- *Planning*
  Ecologists and environmental managers are frequently employed during the preparation of specifications for civil engineering projects. Impact assessments for large industrial, road building or housing developments are required prior to the submission of planning applications and the expertise of ecologists

DRIVING LICENCE

Getting your driving licence and keeping it clean is an important stage for many young ecologists.

If you can get your licence while you're studying, go for it!

and environmental managers may be called upon. Their advice may be needed, for instance, in route planning for new road schemes, to prevent important wildlife areas being threatened.

- *Land and water restoration and utilisation*
  Environmental managers may be involved in designing and supervising restoration projects for disturbed, degraded or contaminated land, in order to maximise nature conservation value. Ecological expertise may be needed in the development of opportunities for recreation in reservoirs or sites used for mineral extraction or forestry. Environmental managers may also be asked to advise on such varied activities as mitigating site management effects in large industrial complexes, designing marine protection schemes around fish farms and oil terminals, or ensuring habitat and species protection on golf courses.

Profile

Mandy Gore

Environmental Management Scientist, English China Clays

Like many people working in the environmental field, I came to my present job via a circuitous route.

My first interest was geology, triggered by romantic illusions of the historic mining industry developed during family holidays in Cornwall. So, I studied for a degree and on graduation applied for and was given a job as a scientific adviser in a small tin mine. This rapidly dispelled my illusions, these being replaced by a realisation of the challenges faced by an historic industry in today's economic and political climate. And then the price of tin collapsed and the mine went down with it. So, I moved into Cornwall's other important mineral industry, china clay.

This was an industry facing even bigger challenges than the tin mines, because its effects were so visible and concentrated in a relatively small area. I became more interested in integrating environmental management into the complexities of this industry than I was in geology. When this was recognised by my senior manager, the company (English China Clays) offered to fund me through a distance learning Master's course in Environmental Management. I jumped at the chance.

I now work in the Environmental Section, within the Mineral Resources Department. My job is to make sure that all aspects of the industry which could impact on the environment are managed to minimise effects. I am also responsible for identifying ways in which opportunities for environmental improvement can be maximised. To be able to do this job effectively, I need to understand the industry and its culture, the local environment and its communities and also to foresee the implications of any actions.

Life is never boring, because of the huge range of issues that have to be addressed. These vary from developing ideas to maximise the environmental quality of land restoration schemes, to identifying technological fixes to minimise emissions from the working of large and heavy machines.

So, although my job title is Environmental Management Scientist, I actually work as an Environmental Oracle supplying information on demand and foreseeing future issues – or at least trying to!

Mandy says:

"To be able to do this job effectively I need to understand the industry and it's culture, the local environment and its communities and also to foresee the implications of any actions."

- *Maintaining and monitoring standards*
  The introduction and implementation of accredited environmental standards, including energy use and waste minimisation, is a requirement for industries, and this may involve ecological input. Agrochemical companies may employ ecologists or environmental managers to test and monitor the effects on wildlife and the environment of products such as toxic chemicals and, increasingly, genetically modified crops and other organisms. At the supply end, another form of monitoring which may require ecological knowledge is the sourcing and certification of sustainable raw materials for manufacturing and distribution industries.

- *Horticulture*
  The gardening industry is becoming very conscious of its potential for promoting wildlife conservation. Advice is needed on such things as water and wetland gardens, wild flower gardening, attracting birds and enhancing butterfly populations.

- *Ecotourism*
  The rapid growth of the ecotourism industry offers opportunities for ecologists. Their expertise is needed in planning for tourism, to ensure that the activity is sustainable and does not damage the environment. Organising, marketing and guiding wildlife tours throughout the world is a developing area.

Qualifications and qualities

A first or second degree in a biological or environmental subject is needed for most positions. Experience or qualifications in business management and an understanding of the commitments and culture of the business world are assets.

Very often, the ecologist or environmental manager is the lone voice in a multi-disciplinary team. As he or she has to be a good persuader or ambassador for the ecological case, ecologists who work for industrial companies have to be highly effective communicators.

Ecotourism guides need to be sociable and experienced in survival techniques and first aid. They need a sound scientific knowledge of the species and habitats being visited, to ensure both visitor satisfaction and the least possible impact on the environment.

Did you know?

According to the ENDS annual salary and careers survey in 2006, The top three most sought after skills in the environment sector are in waste management, pollution prevention, control and general environmental management.

John Box

Associate, Atkins Limited

Profile

Brought up next to a farm in Sussex, my early interests included bird watching and dairy farming. Indeed, I can still vividly remember bringing in the hay in the late 1950s and riding on top of the hay wagon.

A key period was spent with the BTCV in Scotland. After leaving school, I went on a series of week-long tasks in the Cairngorms, Beinn Eighe and Loch Lomond. These taught me about ecology and the practical work required for public access and education on nature reserves. I also learned basic leadership skills and how to work with a group in all weathers in rough countryside.

University choices were hard. I was offered a place in forestry, but decided, after the summer with BTCV, to do a more general degree in biological sciences at the University of East Anglia. The course had an ecology option. Part of the summer holidays was spent working at a couple of research stations run by the Institute of Terrestrial Ecology.

My first job was working on blue-green ('toxic') algae at the Institute of Freshwater Ecology in the Lake District. The view from my desk was northwards up Lake Windermere to the Fairfield Horseshoe. Having attained a PhD, I went around the world for a year. Coming back to Britain, a year of unemployment eventually resulted in my creating a Manpower Services Commission project for Telford Development Corporation. It employed up to 50 people on a wide range of work from ecological survey, to preparing educational packs, to constructing sleeper walkways. This was a good springboard for a job with English Nature, covering the metropolitan county of the West Midlands.

Subsequently, I was asked if I would like to join Wardell Armstrong (minerals, mining, engineering and environmental consultants) as their Principal Ecologist. It was a wrench to leave English Nature, but a chance to work with engineers and geologists on mineral extraction, ground engineering and urban regeneration schemes. After eight years with Wardell Armstrong, I moved to Atkins, a major firm of engineering and environmental consultants, because they had an office in Telford, near my home.

All in all, mine has been a career path where opportunity has been more important than any precisely defined overall plan.

THE STERN REPORT (2006)

Key message of the Stern Report: the economics of climate change. Acting now should be seen as an investment to avoid the risks of the very severe consequences associated with climate change in the future. The costs of dealing with the damage caused in this event would dwarf the costs of mitigating the effects now.

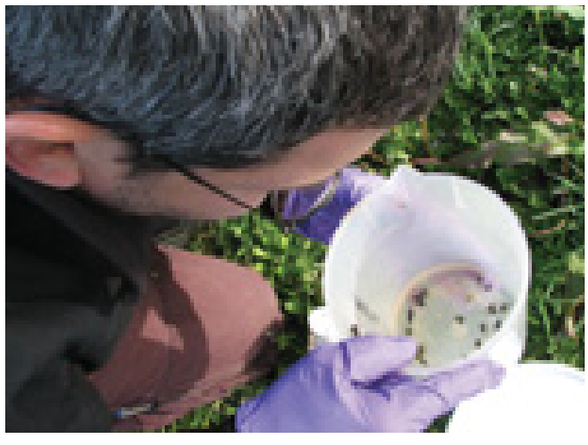
Ecological Consultancy

The increasing volume and complexity of European legislation, together with new environmental laws and regulations in the UK, has resulted in a corresponding growth in the ecological consultancy sector.

An ecological consultant undertakes research and surveys to provide advice on ecological matters such as, how plans to use a particular area of land may affect the plant and animal species and types of habitats present. They will have gained specialist knowledge in this field, such as an appropriate first degree and often a second degree or relevant background in nature conservation as well as field experience. The work is very rewarding but can be quite demanding. Dependant on the type of work involved, completion of various tasks may be restricted due to a number of factors, such as the budget for the work, planning conditions or seasonal constraints. Consultants must have a flexible approach to their work and may have to accept long hours. Survey work is sometimes carried out at night, for example, in the case of bats and newts. A consultant must be prepared to spend periods of time working away from home and in some cases, abroad. The benefits of this are travel to interesting sites and working outdoors. There can also be a lot of administrative work and consultants must frequently work quickly in order to meet deadlines.

The employers

Consultancies vary in size from firms with one or a handful of staff to much larger concerns. Large engineering companies now have ecological divisions that can work with both the engineering teams in-house and on other projects. Some practitioners combine academic work with consultancy – indeed, a requirement to work as a consultant is now written into the contracts of some college and university teachers. The research institutes carry out many of their activities on a consultancy basis and Non Governmental Organisations (NGOs), such as some of The Wildlife Trusts, may also have staff who carry out consultancy work.



The work

Ecological consultancies provide a range of services on a contract basis to organisations that do not employ specialist staff or have insufficient expertise. Many of the larger multi-disciplinary consultancies that employ ecologists may also have staff with estate management, arboricultural, forestry and landscape design skills and experience. Some consultants have an environmental science background and will deal with issues such as contaminated land and air/water quality. The smaller more specialised consultancies may focus in on individual species, for example, bats.

- ***Field survey, monitoring and data collection***
  Consultants are often employed in routine field survey of flora and fauna, in data analysis, mapping and in monitoring of designated sites and proposed development schemes. This is most often carried out in conjunction with collation of existing data that is publicly available from records centres and other bodies. Initial site visits will typically describe the habitats present and assess the likelihood of protected species being found. Often the methodology is the Joint Nature Conservation Committee (JNCC) Phase 1 Habitat Survey, but other standard methodologies are used for follow up surveys. Ecologists are encouraged to specialise in one or more taxonomic groups as their career progresses, as well as developing general botanical identification skills.

- ***Impact assessment***
  A large proportion of consultancy work is now devoted to providing information for Environmental Impact Assessment (EIA) and/or Ecological Impact Assessment (EcIA). Impact assessments are carried out for many projects, often related to the planning process. Projects may include industrial or building

Kathy Dale

Principal Ecologist, EnviroCentre Limited

Profile

I have always had a great love of the countryside and animals. From an early age my mother taught me to recognise some of the common wildflowers in the hedgebanks in south Devon and I worked on local farms and as a conservation volunteer for the Young National Trust in my teens.

I left school with three A-levels in 1983: geography, biology and theatre studies. I really needed chemistry but had no aptitude for it and preferred acting. My biology A-level had a strong emphasis on taxonomy, for which I was grateful later on. I graduated from Loughborough University with a degree in ecology in 1986. The degree was very practical and we were out in the field every week in our first year. There was also a species identification examination and so my field skills in plants and invertebrates were pretty good.

My first 'proper' job was three days a week for the Nottinghamshire Trust for Nature Conservation under a Manpower Services Scheme. I had applied for the zoologist's job but was actually given the botanist's job as I had experience in writing management plans. This made me learn my terrestrial plants in a hurry! After nearly a year I left to join the Nature Conservancy Council's (NCC) Scottish Loch Survey Team in Sutherland and then I worked briefly for NCC in Derbyshire renotifying Sites of Specific Scientific Interest (SSSIs). When I was 22 I was offered probably the first of NCC's external contracts to survey Scottish rivers for notification as SSSIs, which took me to wonderful, pristine rivers all over Scotland, including the islands, for three years.

After 18 months on a Winston Churchill Fellowship traveling and doing conservation work in South America I returned to England and continued with my freelance work. I did a lot of river surveys and then the requirement for Environmental Impact Assessment of developments came along. I was beginning to feel that my degree was a bit out of date so I did a Masters in The Biology of Water Resource Management in 1994 at Napier University, Edinburgh. After sending out a speculative CV, I joined Northern Ecological Services in Aberdeenshire and was there 12 years as the freshwater ecologist before moving to EnviroCentre as a Principal Ecologist. Consultancy work is varied and demanding and I would recommend it as a career. Recent changes in the legislation have meant that ecology is much higher up the agenda now than it ever used to be and I certainly get more respect at meetings with engineers than ten years ago.

developments or transport schemes and consultants must produce evidence of the potential impact of proposed developments on the environment. The impact could be direct, where existing habitat could be destroyed, or it could be indirect, where, for example, water levels are altered, or new pollutants are released into the surrounding environment. This information is used by developers, planning departments, conservation organisations and other stakeholders in a variety of ways, but mainly in public inquiries and when considering planning consent for work on a designated site. Sometimes the consultant employed to carry out the original assessment will also be involved in designing a programme of measures that reduce or cancel the harmful effects of new developments. This is called avoidance, mitigation or compensation. There may also be a requirement to attend planning meetings or give evidence at a public inquiry.

Andrew Baker

Partner, Baker Shepherd Gillespie

Profile

I was brought up in a small village in the Peak District National Park and my first ambition was to become a Park Ranger. I took four A-levels, including biology, geography and economics. At weekends and during the holidays I worked for a fledgling biotechnology company.

At the University of Nottingham I concentrated on ecology options, including a field course in Bavaria, which proved very useful in my subsequent career. I then began ten years as a peripatetic ecologist working on short-term contracts. I wrote management plans for a County Trust; undertook river surveys throughout the UK for the National Rivers Authority and the Nature Conservancy Council; spent three months in Malaysia working in rainforest and coral reef nature reserves; repaired paths in a National Park in Queensland; and carried out botanical surveys for the Peak District National Park.

After a year in an engineering consultancy, carrying out environmental impact assessments, I joined an ecological consultancy. The breadth of experience I had gained during the previous ten years was ideal training.

12 years ago, I and two of my university colleagues established Baker Shepherd Gillespie, which has gone from strength to strength.

- ***Provision of advice***

  Consultants are often called upon to give advice on a wide range of ecological issues; for instance, the type and level of survey work that could be required to meet a particular objective, nature reserve management (including the preparation of management plans), habitat creation or restoration schemes and issues relating to wildlife legislation. This advice usually takes the form of a report but the output may also be in the form of presentations or meetings. More and more, this advice is often focussed on protected species, such as bats, badgers, and great crested newts. This will often result in the consultant preparing a detailed mitigation scheme.

- ***Mitigation and translocation***

  Mitigation schemes usually involve trapping and relocating animals as well as constructing new habitats for them. A specific licence must be held to carry out the work if the animal is a protected species. The consultant will be expected to take responsibility for the success of this work and make sure that all the requirements of the licence are adhered to. Habitats such as diverse grasslands may also be translocated if the conditions are suitable. This type of work involves liaison with engineers, production of method statements and supervision of contractors sometimes involving long periods of time on site.

- ***Research***

  Research projects are often undertaken by consultancies for nature conservation agencies, local authorities and wildlife organisations, to investigate the success or otherwise of

countryside schemes, monitor or prepare inventories of important species and habitats, or to monitor changes brought about by manmade alterations to the environment.

Business management

The more senior members of staff in consultancies generate policies, give advice, deal with legal and financial matters, engage in activities to generate new business and work closely with clients. They also supervise the work done by more junior staff, appraise their training needs and provide the relevant training required. Project management is becoming a valuable skill as various elements such as finance and health and safety need to be incorporated into the work. Senior ecologists may become involved in public inquiries and need to be able to present information clearly and knowledgably.

Qualifications and qualities

A first or higher degree in a biological or environmental subject is generally required. Entry into ecological consultancy often requires an ability to identify a range of plants and animals accurately, particularly 'indicator' species. Staff need to be able to apply current techniques, such as Phase 1 Habitat Survey and the National Vegetation Classification (NVC), which are widely used in ecological surveys and appraisals. Consultant ecologists must have excellent written and verbal communication to be successful in their work. The ability to make effective use of computers in conjunction with the most up-to-date equipment and techniques is essential for consultancy work. A driving licence is almost always needed as site visits are not always possible by public transport. Writing with a high level of competence is essential as consultants have to prepare concise yet clear and logical reports with regard to the survey work that they undertake. Membership of an appropriate professional body, such as IEEM, is now often a requirement. Increasing seniority requires a full range of management skills, including the ability to work with and influence others. Normally, it is only after many years of experience and the accumulation of a large range of skills, that someone is able to run a consultancy.

Profile

Kate Fisher

Senior Ecologist, Parsons Brinckerhoff

I am currently Senior Ecologist and team leader within the dynamic environmental division of a large multi-disciplinary consultancy, Parsons Brinckerhoff. My current role is to grow and support the expanding ecological team, as well as to find practical, ecologically sensitive solutions to development, to ensure that work is delivered on time and to budget.

My path to this position has been a colourful one, fuelled by my passion for the natural environment, which started from a young age. I studied zoology at the University of Wales, Cardiff, and completed a vocational Masters in Environmental Protection at Salford University. Whilst at University, I was involved in voluntary work with a variety of conservation organisations. Interacting with business throughout the MSc course and a three-month unpaid work placement with the Countryside Council for Wales, gave me an insight into both the business sector and the conservation movement. I secured my first position with the ecological consultancy Baker Shepherd Gillespie through sending a speculative CV through their door. In addition to my qualifications, my volunteer work was a great asset.

Since then, I have completed over 12 months of overseas ecological voluntary work and have worked for a number of small ecological/environmental consultancies before joining the large company, Parsons Brinckerhoff. I am now focused on developing my own skills, gaining more experience and encouraging colleagues to do the same. There is now a whole profession based on the recruitment of ecologists.

Kate says:

"If you are looking for a job in ecology, my advice is not only to sign up with employment agencies but also to approach consultancy companies directly, following up your CV with a telephone call."

Non-Governmental Organisations (NGOs)

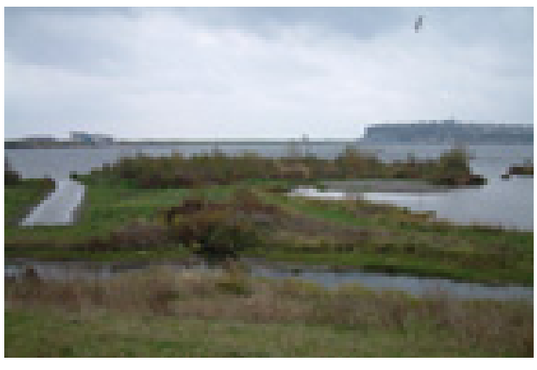
For the young and aspiring ecologist, NGOs provide an accessible and attractive route into work in practical ecology. Organisations such as the Royal Society for the Protection of Birds (RSPB), County Wildlife Trusts and the National Trust employ, between them, a large number of ecologists and environmental managers, but competition for salaried posts within NGOs is very strong. The employment opportunities offered by NGOs are as wide as the variety of work done by them, but many jobs are temporary or seasonal. Voluntary work for NGOs is often used as a stepping stone to work elsewhere.

NGOs have an increasing influence on attitudes to the environment. The Farming and Wildlife Advisory Group (FWAG) is an excellent example of an NGO which enjoys recognition and acceptance by the Government Ministries, the National Farmers Union, the Country Landowners Association, farmers and other NGOs. Changes in the attitudes of many farmers and landowners towards conservation have been achieved by persuasion and sound reasoning provided by FWAG advisers.

The employers

Broadly, NGOs can be split into four main categories of interest to ecologists or those wanting environmental work. Some organisations fit more than one of these categories.

- NGOs that own nature reserves or manage land for wildlife conservation. This group contains: the Royal Society for the Protection of Birds (RSPB), The Wildlife Trusts (the County Trusts in England and Wales and the Scottish Wildlife Trust), the Wildfowl & Wetlands Trust, the National Trust, the National Trust for Scotland, Plantlife International and the Woodland Trust.



- Campaigning organisations including: Friends of the Earth, Greenpeace, the Marine Conservation Society, the Worldwide Fund for Nature (WWF) and Buglife. Many of the first group of NGOs, for instance the RSPB, Plantlife International and The Wildlife Trusts, are also campaigning organisations.

- Practical conservation organisations including: the BTCV, the Conservation Volunteers for Northern Ireland (CVNI), the Scottish Conservation Projects Trust (SCPT), the FWAG, and Groundwork Trusts. The last are bodies co-funded by Government and industry, that carry out practical environmental work in urban or regeneration areas.

- 'Learned societies' and research and data recording organisations, such as the British Ecological Society (BES), the Botanical Society of the British Isles (BSBI), the National Biodiversity Network (NBN) Trust, the Royal Entomological Society, the British Trust for Ornithology (BTO) and Birdlife International.

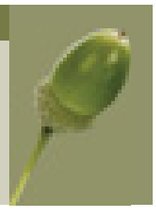
The work

- *Practical conservation*

  NGOs own or manage a very large area of land throughout Great Britain. Whilst much of the estate work carried out by land owning NGOs is done by their own rangers, estate workers and members, some of them use other practical conservation organisations to help

Did you know?

According to WWF: every 20 minutes another species becomes extinct.



Profile

Andy Tasker

Director of Warwickshire Wildlife Trust

I remember as a kid having a fascination for living things, and lots of questions. How do tadpoles turn into frogs? How do caterpillars know when to turn into a chrysalis, then how does a butterfly emerge? I didn't know it then, but the natural world was to become the focus of my career, influencing my choice of A-levels and beyond.

Not wanting to specialise in botany or zoology, I was attracted to Birmingham University's biology degree, where a visiting speaker – Tony Bradshaw, then a lecturer at Liverpool – inspired my interest in applied plant ecology. I went on to do a PhD at York, researching the problems facing plants growing on colliery spoil. To my disappointment there were no jobs afterwards in practical habitat restoration – or at least, none that I could find.

So, I became a teacher for a year, enjoying the positive engagement with kids, but hating the petty discipline, rules and marking. It was also a useful time to focus on what I really wanted to do – engage people with practical applications of ecology in the real world.

After writing up my PhD and a year as a demonstrator in biology at Keele University, I finally achieved my ambition in 1977, when I was appointed a lecturer in ecology at Coventry Polytechnic. Polys in those days were great: focussed on the real world, not academia, with courses aimed at student needs not lecturers' pet research topics, and an amazing bunch of both staff and students. There was also time to develop consultancy work and volunteering, which led to becoming Chair of Warwickshire Wildlife Trust. Then a chance opportunity for an exchange visit for a year led me to swap job, house and car to live as a real-life Professor in Wisconsin USA: a life-changing experience.

When the new post of Director of Warwickshire Wildlife Trust was advertised I felt fortunate to get it! Despite some incredulous looks from Polytechnic colleagues who saw pay cut and no security, I saw opportunity and challenge. The Trust has now grown from a staff of six to over 70, including our successful biodiversity consultancy Middlemarch Environmental Ltd. My role has changed beyond recognition, involving strategic development, business systems and marketing, but built on an understanding of ecology and a desire to engage people in conserving our natural heritage. And I still wonder how caterpillars turn into butterflies...

HOW ORGANISATIONS WORK TOGETHER

Various sectors often come together to achieve common objectives, one such example is the creation of the Wallasea wetlands in 2006, in Essex.

Following the loss of two areas of salt marsh and mudflats in the 1990's, and a European Court of Justice ruling, a new wetland was created to replace lost habitats.

The Department for Environment, Food and Rural Affairs, the Environment Agency, Natural England and RSPB worked together with Harwich Haven Authority and Wallasea Farms to ensure that environmental, social and business factors balanced with the projects remit. This was primarily to complement existing strategies, create a sustainable site for displaced bird populations and provide flood/storm defences.

Work was completed in 2006, and an area of 115 hectares was flooded when the protective walls were deliberately removed.

The project has created a wetland of connected streams, islands, mudflats and marshes in Europe's largest man made marine wetland.

The Wallasey wetlands will provide feeding and roosting habitats for birds such as oystercatchers, avocets, little terns, shelduck, and dunlins as well as fish nurseries for bass, mullet and flatfish.

Extract from BES Teaching Ecology Newsletter: Issue 33.

with specific tasks. These might include scrub management, hedge laying, ditch maintenance, stone wall construction, pond digging and woodland management. The BTCV, SCPT and CVNI run programmes of tasks throughout the UK. Volunteers are trained by professional staff to carry out practical tasks in nature reserves and on land which has other forms of amenity value, like recreation.

Groundwork Trusts employ, amongst others, ecologists and project officers. Some Trusts operate a graduate training scheme. Opportunities also exist for volunteers to work with these organisations.

- *Information gathering and campaigning*

The energies and resources of campaigning and pressure group NGOs are devoted primarily to gathering environmental data and to fund raising. They employ campaign managers, advisors and project-based staff, who may research and collect information on conservation issues, supervise ecological surveys, carry out impact assessments, assess planning applications, prepare and give evidence at public inquiries, formulate conservation policies or produce campaign literature. The analysis of information provides evidence to persuade central and local government, companies, landowners and farmers to act on conservation issues, demonstrate greater environmental awareness and manage resources in sensitive and responsible ways. Some NGOs are very active and influential at an international level. The WWF, Greenpeace and Birdlife International, in particular, offer opportunities for work overseas.

- *Recording biodiversity*

A number of NGOs specialise in the collection, compilation and dissemination of biological records and in other work on biodiversity. Most of this information is gathered by volunteers,

but some of the work is done under contract to Government departments or agencies. The NGOs employ project managers and

Did you know?

NGOs can provide excellent opportunities for those wishing to combine ecology and education as they often have strong outreach programmes.

research staff to co-ordinate surveys, often at a national level, and to analyse the data. The information is used mainly in nature conservation and applied research. Further reference to this is made in the chapter on *Science and Research*.

Qualifications and qualities

Since so many people apply for jobs with NGOs, employers can be selective. They tend to favour people whose commitment, skills and ability to work with others have already been tested and proven through voluntary work.

A relevant degree is needed for entry to science-based posts. For more practical jobs in countryside management National and Higher National Diplomas or Certificates are often acceptable. Some employers offer 'on-the-job' technical training in skills that lead to vocational qualifications. NGOs employ clerical and administrative staff and for these jobs some ecological knowledge (*e.g.* a GCSE in a biological subject) is an advantage.

In the case of FWAG advisers, a sound knowledge of farming, as well as ecology and habitat management, is essential. The larger NGOs offer employment opportunities for land agents, foresters, agriculturists, economists and lawyers.

People who work for campaigning bodies need to be excellent communicators, as well as technically qualified.

Nicola says:

"After my degree I took up a volunteer job at Sheffield City Ecology Unit. Here, I worked with the City Ecologist, mostly investigating planning proposals in a bid to ensure that the green bits on the Unitary Development Plan map remained green on the ground."

Profile

Nicola Hutchinson

Biodiversity Programme Coordinator, Plantlife International

I grew up in Nottingham and the limestone dales of the Peak District were my favourite outdoor adventure playground and undoubtedly where my love of nature and landscapes first began. Family holidays in the Lake District, Yorkshire Dales and Northumberland all added to my enthusiasm, and I soon realised that I wanted to work in a sector that cherished the environment and worked positively within it.

My first inclinations were towards 'green' engineering and I embarked on A-levels in mathematics, physics and chemistry. That all changed when I was drawn towards a degree in Natural Environmental Science in Sheffield, with its focus on the processes within and between geology, geography and ecology. I rather fell for Sheffield, with its criss-crossing valleys and fusion with the Peak District, and so after my degree I took up a volunteer job at Sheffield City Ecology Unit. Here, I worked with the City Ecologist, mostly investigating planning proposals in a bid to ensure that the green bits on the Unitary Development Plan map remained green on the ground. It was during this job that my conservation interest became more plant-focused, as my colleague was a botanist who showed great enthusiasm on our site visits.

Ultimately, I embarked on a Master's in Ecology and Environmental Management at York. The course centred around three research projects, all of which I chose because they were focused on plants. My final project was undertaken at the Central Science Laboratory and this placement helped me decide that I wanted to work outside academia. So in 1999, I took up a post with Plantlife.

Plantlife is the wild-plant conservation charity working in the UK and globally to champion plant diversity. My first task with Plantlife involved establishing a biological database and digital mapping facility to support the species recovery programme, which delivers elements of the UK Biodiversity Action Plan. In recent years, devolution and regionalisation across the UK have added an abundance of strategies, plans and new partners to the biodiversity sector, and nowadays I work with a team of people helping to coordinate these by implementing the Global Strategy for Plant Conservation in the UK, through a programme called *Plant Diversity Challenge*. It remains a challenge keeping plant diversity on the environmental agenda, but one that I feel inspired to be involved in.

The Media and Public Relations

There has recently been an enormous growth in the environmental media industry, with television, radio, magazines, books, websites, exhibits and interpretation centres contributing to the quality and amount of material available. The people who control and direct the industry tend to come from journalistic backgrounds, but many of the people who make the films, write the books and magazine articles and take the photographs are ecologists by training or persuasion. The BBC Natural History Unit provides an excellent example of effective symbiosis between media people and biologists.

The employers

Three important categories of employer are:

- publishers of books, magazines and newspapers (scientific journals are covered in the chapter on *Science and Research*);
- radio, television and film companies;
- environmental Non-Governmental Organisations (NGOs);
- statutory nature conservation and countryside agencies; and
- museums, zoos and botanical gardens.

The work

- *Writing about the environment*

  Many national newspapers and magazines employ environment correspondents. Professional ecologists and campaigning journalists may also be paid to write articles for newspapers, magazines and journals. This kind of writing is mainly 'piece' work, in which an author is commissioned to write (or may write and then submit) articles to magazines like *British Wildlife, BBC Wildlife, Natural World* or *New Scientist*.

  Larger commissions (*e.g.* for books on environmental topics) are arranged by publishing houses or sometimes by organisations such as the statutory conservation agencies. Staff of these agencies are often required to produce reports and booklets about conservation issues for publication. Increasingly, information is being made available through the Internet, so there is a growing demand for people who are able to design websites. Journalism may provide opportunities for foreign travel.

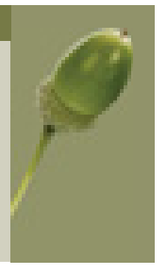
- *Editorial and commissioning work*

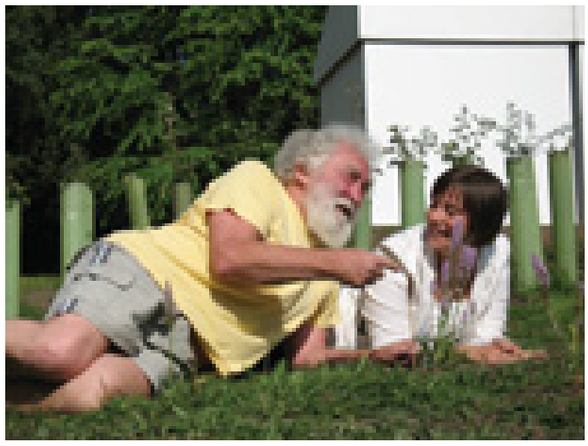
  Publishers (including NGOs such as the Royal Society for the Protection of Birds (RSPB) and the National Trust) of magazines and books

Did you know?

With climate change firmly entrenched in the political and media agendas. The Queen's Speech to parliament in 2006 announced a Climate Change Bill:

"My Government will publish a Bill on climate change as part of its policy to protect the environment, consistent with the need to secure long-term energy supplies."
Queen's Speech, 15 November 2006.





about the environment employ editorial staff who work with or commission material produced by others. Photographs, as well as written material, are in demand. (See also the chapter on *Science and Research*).

- ***Radio, television and film***

  Production of films and broadcasts about wildlife and the environment creates openings for presenters, researchers, technicians, film crews and producers. The popularity of wildlife films and programmes gives this kind of job a romantic appeal. Not surprisingly, competition is intense and those who are successful often work on short contracts.

- ***Public relations and environmental interpretation***

  The dramatic growth of NGOs and the need for them to create and maintain an effective public image offers opportunities for ecologists who are good communicators. Publicity managers and fund raisers are employed by NGOs.

  Statutory agencies, too, have publicity and press officers. Many organisations, including

Professor David Bellamy OBE

Conservationist and Media Personality

Profile

My dream was to dance in classical ballet. I grew too big, so I became an ecologist and have been dancing around the world ever since. The problem is that like many ballets what I see rarely has a happy ending.

A BSc Honours degree in botany and a PhD in the ecology of European mires, both at London University; lecturer and senior lecturer in botany at Durham University; research interests – phytosociology, ecology and evolution of ecosystems, especially mires, coral reefs and inshore marine ecosystems. Marine pollution was my downfall or my upgrade, depending on which way you view it, for the Torrey Canyon disaster pitchforked me onto the media, where I have been ever since.

The upside of the media has been access to the whole world of botany, the powerhouse of the biosphere. In my travels I have seen the mounting problems, as well as the solutions, first hand. The sad thing is that good news is of little interest to the media, so there is a lot of talk and little gets done.

Forty-three books, more than 400 television programmes, three honorary professorships, several honorary degrees, an OBE, a Global 500 Laureate and almost 40 years of campaigning to save the natural environment. Deep down I am still a phytosociologist trying to understand why plants live in recognisable communities and what the continued destruction of the world's natural vegetation means to all our futures. Some days I wish I had stuck with academia, but the grass always looks greener from the other side, especially if you are an itinerant botanist and peatnick. Wow, that dates me!

David says:

"Ecology as a career? Well, at least you will never be alone, for wherever you find yourself you will always be affecting the local ecosystem. Ecologists are surrounded by insurmountable opportunities – lots of ecosystems with lots of problems, which only people well trained in ecology can solve."

Gail Vines

Science Writer and Editor

Profile

After a first degree in biological sciences, I completed a PhD in behavioural ecology of birds at the University of Aberdeen. I loved the field work and the community of students and staff. When I had to move on, I was pleased to land a post-doctoral post at Bristol University, doing more field studies of wild birds. Then, trying to salvage something from a failed grant application, I wrote up my pilot research in what I hoped was the style of a feature article for *New Scientist*. To my joy and amazement, the magazine's features editor liked it and published it.

It was a turning point: it gave me the idea that writing about biological sciences for a wider audience was something I could do and really enjoy. In my spare time (I was working as a science teacher by then) I scoured the current journals, looking for reports of new research that might make good news pieces for New Scientist. I gradually learnt the ropes as a freelance contributer, thanks to the kindness and patience of the magazine's staff journalists, many of whom had backgrounds in science too.

A couple of years later, I was lucky enough to land a full-time job on the magazine, commissioning and editing biological features mostly written by professional scientists. It was a fantastic job. Working with a team of sparky staff and meeting boffins with fascinating ideas, I was always learning something new. I had quickly to get up to speed with immunology and molecular biology, but tried not to neglect the ecological sciences.

After a stint as features editor, I left full-time work at New Scientist to work as a freelance again. It's not so much fun, I have to admit, but the hours are better, and I've been able to write for the magazine of the Royal Botanic Garden at Kew, and work as an editor for the wild-plant charity Plantlife – work that fits perfectly with my ecological background.

Gail says:

"I'd recommend science journalism to people with wide interests – the magpies of this world – and to anyone who enjoys the challenge of grappling with new ideas. The result may be a 'butterfly mind', but let's hear it for the Lepidoptera!"

NGOs, statutory conservation agencies, Forest Enterprise, national parks authorities and local authorities, run visitor centres to inform the general public about nature reserves, parks and other areas of ecological or landscape value and to generate appreciation of the environment. Scope also exists in museums, zoos and botanic gardens for work in environmental education, interpretation and customer care. Much of the work involves the maintenance and display of collections, but the modern emphasis has moved on from the simple acquisition of material to exhibits that demonstrate how conservation and biodiversity can be achieved. There are specialist groups, such as the Museums Association, which provide an introduction to careers in museum work.

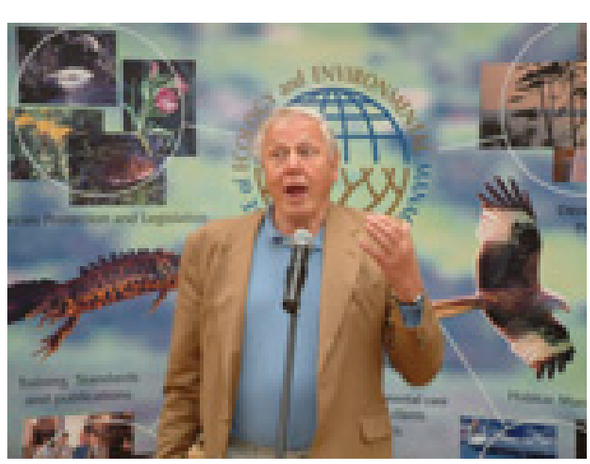
Campaigning

The chief activity of many NGOs is campaigning on environmental issues. The effectiveness of these organisations depends to a large extent on employing forceful and credible campaign promoters and political lobbyists. (See the chapter on *Non-Governmental Organisations*)

Qualifications and qualities

Openings in broadcasting and the film industry are very few and the offer of positions is dependent on evidence of flair. Competition is intense and it is necessary to establish a good reputation to ensure future involvement. Technical or academic qualifications, for instance in film production, photography or media studies, are often required.

An ability to write fluently and accurately and a sound knowledge of ecology are essential



for people wishing to be considered for environmental journalism. A science degree and specialist biological knowledge are advantages, and a qualification in journalism is often required. Environmental correspondents and journalists must be prepared to produce material to strict deadlines and may need to cover a wide range of environmental topics. Examples of material written and accepted for publication should be presented as evidence wherever possible.

A qualification such as a postgraduate certificate or a masters degree in museum studies is an advantage for museum work. Experience in art and design (especially of websites) is valuable in publicity work and a teaching qualification can be useful for interpretative work. Publicity managers, campaign promoters, political lobbyists and fund raisers have to be effective persuaders.

Salaries and prospects in the Ecology/Environment sector

The environment sector currently has an annual turnover of around £25 billion; however most employers are still expanding with greatest growth seen in the environmental management/ consultancy fields. By 2010, it is predicted that sector will see an annual turnover of £700 billion.

The table below shows the average salaries given by age group in the ENDS report 2006.

Age (Years)	Average Salaries: rounded to nearest figures (£)
20-29	23,000
30-39	32,000
40-49	36,000
50+	41,000

Reference: Threw, L. Skills shortage keeps employers on their toes, Salary and Careers survey. The ENDS directory 2006.

Science and Research

Research into ecology and environmental management covers a very wide range of topics and ecologists are employed as researchers in many of the employment sectors listed previously. Academic institutions and research centres carry out much of the baseline research, working to contracts awarded by organisations such as the Research Councils, countryside agencies, Government departments and industrial clients. Other research is done as personal projects, carried out alongside other aspects of the job, such as university teaching. Results of research are published in scientific journals and specialist magazines. Some of the research data generated are published and used by the media to create awareness or to lobby and persuade.

The employers

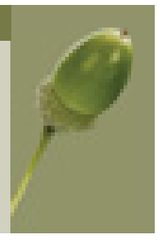
The main employers in this field are:

- universities;
- research organisations funded by the Natural Environment Research Council (NERC), including the Centre for Ecology and Hydrology (CEH) (currently being reorganised), the National Oceanography Centre (a joint venture with the University of Southampton) and the British Antarctic Survey (see also the chapter on *The Government and Statutory Sector*);

- organisations that carry out environmental and biological research for government departments dealing with agriculture (*e.g.* the Institute of Arable Crops Research (Rothamsted), the Institute of Grassland and Environmental Research and the Scottish Agricultural College);

Did you know?

NERC is one of eight UK research councils and together they are the biggest public funders of cutting edge research in the sector spending around £3 billion every year.



- Government agencies (see chapter on *The Government and Statutory Sector*);
- museums (both national and local), zoos and botanic gardens;
- industry (see chapter on *Business and Industry*); and
- non-governmental organisations (see chapter on *Non-Governmental Organisations*).

The work

Junior scientific positions are often laboratory based or involve fieldwork. Senior staff act as team or project managers and as strategic planners. Opportunities exist for working abroad on some projects. There are also academic jobs available, offering support to research scientists. Examples are laboratory technician work or practical work in zoos and botanic gardens. The following are examples of the type of work.

Pure and applied research

Pure ecological research is carried out mainly in universities and specialist organisations such as the CEH, although some takes place in other Government funded institutes, museums, zoos, botanic gardens and large companies. Much of the work carried out in universities for higher degrees is pure research. Most of the organisations already mentioned also carry out applied ecological research. This may investigate the population dynamics of species which are either too numerous or are under threat; the ecological impacts of agricultural policy, climate change, genetically modified crops, pollution, implementation of legislation or introduced species; or methods of habitat restoration. Some applied research involves the testing of products on species or ecosystems; some is concerned with campaigns to create awareness (*e.g.* the effects of stress on hunted animals); some is directed towards monitoring the quality of air and water.

Biological recording

A huge amount of data on species distribution is collected, mainly by amateurs in botanical, ornithological, entomological and similar specialist societies. Some NGOs, such as the

Helen says:

"Lecturing is providing me with the ideal career – a chance to pursue my research interests at the same time as meeting many interesting people from a variety of backgrounds and with a diverse range of interests."

Profile

Helen Roy

Lecturer, Anglia Ruskin University, Cambridge

Pond dipping, bat watching and small mammal surveying are the activities that began my fascination with ecology and prompted my decision to study biology at University. During my first degree I developed a specific interest in behavioural ecology, which led me to undertake a PhD in ladybird behaviour. After this I was offered a lectureship at Anglia Ruskin University.

There isn't really a typical day as a lecturer. The teaching part of the day may comprise a formal lecture followed by less formal seminars or tutorials. Practical classes in the laboratory or in the field provide a great way to put some of the things learnt into practice. Field trips really bring the subject to life; whether watching deer rutting on Rum (Scotland) or assessing abundance of molluscs on rocky shores in Devon, ecological principals are made unforgettable by experiencing them in the 'real world'.

Along with the teaching, it is essential to find time for research. I am currently involved in various projects focusing on insect ecology and behaviour, including monitoring the impacts of the invasive harlequin ladybird, assessing the overwintering mortality of the native 7-spot ladybird and investigating the effects of fungal pathogens on insect behaviour. Research is not only another fun part of the job, but enables a lecturer to contribute to the current development of his or her chosen subject. Furthermore, exciting results can be promptly conveyed to the students, giving lectures a new perspective. Conferences are another venue for presenting results and provide an excellent opportunity for hearing about the latest work in the field and catching up with other enthusiasts. It is important to publish results. Communicating science is what it is all about, and this can be achieved in many different ways, from lecturing, to press releases to peer reviewed publications.

The lecturers within the department represent a wide range of research interests, from molecular to ecological. There is always someone to discuss a new idea with and often someone who will provide a different perspective or approach. Undergraduates, postgraduates, research fellows and technicians also contribute to lively discussions. Lecturers are encouraged to form links with other institutions and these links also provide exciting opportunities.

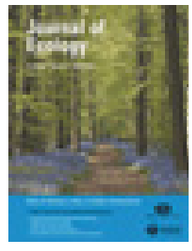
British Trust for Ornithology (BTO), hold their own information and employ staff to handle the data. Others pass data to local Biological Records Centres (often run by provincial museums) or to the national Biological Records Centre, operated by the CEH, for storage on computer, analysis and dissemination. Biologists are employed in records centres and the information is used in nature conservation, planning and applied research.

Conservation work in zoos and botanic gardens

Zoos and botanic gardens are important employers of biologists and ecologists and many are deeply involved in conservation projects. Some zoos are now running captive breeding programmes in which the release of endangered species back into the wild is the major objective. Parallel studies aim to determine the habitat requirements of endangered plants and animals. The international seed bank at Kew is the most important in the world and is making a significant contribution to the conservation of threatened plants.

Editorial work for scientific journals

Publishers of scientific journals, such as *Biological Conservation* and *Journal of Ecology* employ editorial staff, often on a part-time basis. Journal editors are experienced scientists, whose job includes sending proposed papers to referees and, in the light of their comments, making a judgement on the suitability of the contributions for publication. Some organisations employ staff to compile databases of references and abstracts on scientific topics, including ecology, for publication in electronic form.



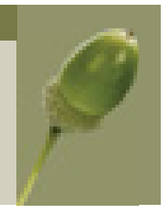
Qualifications and qualities

Research posts are highly sought after and some staff are employed on short term contracts. For scientists, a first degree is essential and usually entry to the profession follows the acquisition of a higher degree. Skills in computer use, a high level of numeracy and the ability to communicate effectively are all required. Knowledge of the natural environment, taxonomic skills and experience of environmental management are in demand for posts in applied ecology.

Clerical and technical support posts are available in some areas of work to those with appropriate HNDs and to school leavers who are numerate and have suitable GCSEs (Standard Grade in Scotland) or A-levels (Higher in Scotland).

Did you know?

Biological recording is increasingly linked to the media with television programmes such as 'Springwatch' encouraging the public to actively engage in recording species distribution and phenology.



James Bullock

Plant Ecologist,
Centre for Ecology and Hydrology

Profile

I did biology at university because I had a long-standing interest in natural history, particularly insects. I did not want to restrict my options, so I chose a biology course at Imperial College, London, which offered variety and flexibility.

Insects retained my interest and I went on to Liverpool University to do a PhD on insect-plant interactions. Strangely, this metamorphosed, under my own impetus, into a study of plant population ecology concerning growth dynamics and competition in grasses. I was then offered a post-doctorate at the Open University, where I was part of a small team studying aspects of both applied/conservation and theoretical plant ecology by looking at plant population responses to grazing.

At the end of this I had four months of unemployment, looking for a job in universities or research institutes. At this time I considered other careers because of the lack of jobs, but I decided to stick at it.

I was offered a post at the Institute of Terrestrial Ecology (ITE) in Dorset. ITE started out as part of the old Nature Conservancy, but subsequently became a Government funded research institute and has recently been re-organised to become part of the CEH. Since the 1980s, Government funding has declined and so the majority of funding now comes from contracts.

Working for ITE/CEH allowed me to keep my interests in plant population ecology and expand into new areas. My core research has been well funded within ITE/CEH and I have been especially interested in applying population ecology techniques to looking at landscape-scale processes such as dispersal and colonisation. Other work has been more contract-driven, and while this can be a bind and in some cases tedious, it has opened up new interests, for instance in species and community translocation and genetically modified organisms.

James says:

"It can be complicated juggling many different projects and budgets, with deadlines pressing at all times, but the variety of the work stops too narrow a focus on a single academic discipline and encourages me to think of the wider world and how my research may be of use."

Teaching

Teachers in schools, colleges and universities enjoy more job security and have better promotion prospects than people in many other jobs in ecology. Career opportunities include promotion within the system, involvement in teacher training and working for examination boards. There is plenty of opportunity to choose where to live – there are schools everywhere from inner cities to remote island communities, from the Isles of Scilly to Shetland. For the right kind of person, teaching can offer great job satisfaction. The multi-disciplinary nature of ecology helps to make ecologists flexible and effective science teachers.

The employers

There are at least 5,000 secondary schools in the United Kingdom and each employs several science teachers. There are many more primary schools. This could mean that school teaching offers ecologists more jobs than all the other careers in this book put together. There are teaching posts in colleges and universities, as well as opportunities for ecologists to teach in field study centres. Some of these are administered by local authorities or national park authorities, others are run by universities, commercial enterprises, the Field Studies Council or other Non-Governmental Organisations (NGOs).

The work

Mention has already been made in the chapters on *The Government and Statutory Sector* and *Non-Governmental Organisations (NGOs)* of environmental interpretation. This section deals with more formal aspects of education.

Primary school teaching

A primary school teacher often teaches a range of subjects in an interdisciplinary fashion, so primary teaching offers scope for creativity without the rigid subject boundaries of the secondary school. Most young children are fascinated by animals and plants and will appreciate a teacher who knows about ecology. Out-of-classroom activity can combine ecology with number, creative writing and art work, and teach children to enjoy, understand and care for the environment.

> *"Every young person should experience the world beyond the classroom as an essential part of learning and personal development, whatever their age, ability or circumstances".*
>
> The Education outside the classroom manifesto, November 2006, Department for Education and Skills.

Secondary school teaching

Ecologists entering secondary teaching tend to specialise in biology up to A-level (Higher in Scotland). There are schools that welcome teachers who are keen ecologists to develop field studies and organise field trips. A biology teacher needs to be able to teach not only ecology but also elementary chemistry and physics, cell biology, microbiology, genetics and human physiology. For many teachers, one of the main things that makes secondary teaching rewarding is seeing adolescents growing up.

Teaching in sixth form colleges

In a sixth form college the absence of younger pupils means that the institution differs in character from a traditional school. There

Sarah Dalrymple

Teaching Fellow in Plant Ecology, University of Aberdeen

Profile

I was brought up in a family with more environmental awareness than average at the time (*i.e.* we recycled, went Youth Hostelling and had Greenpeace family membership) and consequently, I wanted to be an eco-warrior at the age of 15. My Mum suggested that I might be of more use to the environmental movement if I went to university and educated myself in the relevant subjects, so after a gap year spent volunteering I went to Bradford University to do a BSc (Hons) in Environmental Science.

Due to the broad nature of the degree I studied a bit of everything including pollution science, geology, ecology, meteorology, environmental economics and natural resources. I really enjoyed my course but couldn't decide which direction to take until my third year work placements. These allowed me to work for six months in the Environment Impacts Group at the Marine Laboratories, Aberdeen and another six months as a ranger with the National Trust for Scotland. Both experiences were brilliant in their own right but the comparison also helped me realise that ecology and conservation were what I wanted to pursue.

At this point I wanted to stay at university so I looked around for funded PhD places. I only applied for two as I preferred the idea of getting a job to the risk of studying something I didn't like for three years. Luckily I gained a place at Aberdeen to work on an endangered wildflower and the options available to prevent its extinction. The applied nature of the project and direct contact with conservation professionals meant that my project was very rewarding; we started an introduction programme for the species based on my research before I had even started writing up my thesis. I also took every opportunity to go to conferences and meetings with established ecologists and conservationists. This increased my confidence in public speaking, my awareness of the sector and gave me an enviable set of contacts for someone at that stage in their career. Another opportunity was the creation of the position of Student Representative on the British Ecological Society Council. I successfully applied for it and had to quickly get used to attending Council and committee meetings, producing discussion papers, approaching people at conferences and writing articles for the member's publication.

Doing all these extra things during my PhD was very hard work but worth it – it was very exciting and after a few short paid contracts and taking part in (unpaid) rare plant surveys across Scotland, I got my current post as Teaching Fellow in Plant Ecology in the department where I did my PhD. I teach a wide range of subjects including plant ecology, nature conservation, environmental pollution, ecosystem processes, climate change... the list goes on and I'm lucky to be teaching such a diverse programme, that reflects my academic background and interests.

Sarah says:

"Doing all these extra things during my PhD was very hard work but worth it."

is greater emphasis on specialist academic disciplines than in a school, with more opportunity to teach A-level courses. Sixth form colleges also run one-year GCSE courses and may offer General National Vocational Qualifications (GNVQs), covering some environmental subjects. A few colleges even offer the International Baccalaureate.

Teaching in colleges of further education

Colleges of further education not only cater for the 16-19 age group, but also deal with older people. They offer a wide range of specialist courses, including those which support or are aligned to National Vocational Qualifications (NVQs) or Scottish Vocational Qualifications (SVQs). These are workplace, competence focused qualifications, which include subjects such as environmental conservation and management. Many colleges offer National and Higher National Certificates/Diplomas and some provide degree courses. An ecologist appointed as a biology lecturer might have to teach an A-level/Higher class, a non-examination recreational evening class on plant ecology for adults, a GCSE science re-sit class, a science course for hair dressing students and microbiology input to a catering course! This type of institution offers interesting variety to those able to adapt their teaching to a broad ability range.

Teaching in colleges of higher education and universities

A young university teacher may have to accept short-term contracts before being appointed to a permanent post and university lecturers are not necessarily better paid than school teachers.

Mark Smith

Head of Biology, Leeds Grammar School

Profile

I have always been fascinated by the living world and by the challenge of explaining and interpreting it to others; that's why I became a teacher. Although my degree course, at Exeter University, was in zoology, my interest and choice of optional modules was increasingly concerned with the interactions between organisms. So began my conversion to an ecologist.

As a teacher in the secondary sector, I teach all aspects of biology to a whole range of ages and abilities. However, ecological field work has always featured strongly in my teaching, because of my belief that biology comes to life in real outdoor situations. Early in my teaching career, I took part in several overseas expeditions for school pupils, organising field projects investigating aspects of these new and exciting environments. I realised that there was tremendous opportunity for using such expeditions to interest young people in the ecosystems of other parts of the world and for them to confront global conservation issues at first hand. Since then, my teaching has been a mixture of the formal in school and the informal on expeditions, but with the common aim of enthusing young people about life science and encouraging them to face up to crucial environmental issues. No two days are the same!

But in spite of this, entry is highly competitive. The challenge of teaching ecology to a high level to well motivated students, combined with the opportunity to be at the cutting edge of research, make this a very attractive career for many people. Initial Teacher Education (ITE) takes place in university faculties of education or in colleges of higher education.

Teaching in field study centres

A field study centre may provide for the whole age range from primary to higher education and will also cater for groups of adults who wish to spend time studying natural history or participating in an increasing range of other outdoor pursuits. A number of centres collaborate with employers to offer workplace experience and assessment towards NVQ/SVQs. A field study centre offers the opportunity to specialise in teaching ecology in both geographical and biological contexts and usually the chance to live in a rural situation. Some centres provide opportunities for research and involvement in local conservation initiatives. Staff may work unsocial hours, but in spite of this the job satisfaction means that there is a lot of competition for vacancies.

Qualifications and qualities

A degree with an emphasis on ecology can provide an excellent preparation for a career in teaching. A graduate usually enters teaching by taking a one-year course of ITE, leading to a Postgraduate Certificate in Education (PGCE). Another route into teaching is through a degree course combining ITE with academic and creative subjects, which may include environmental science, biology or geography. The second route is the way many people enter primary teaching.

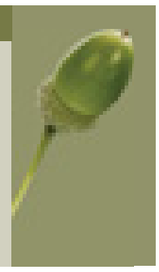
Lecturers in colleges of higher education and universities usually have a PhD and post- doctoral research experience. ITE lecturers normally have some experience of school teaching. Field study centres may employ graduates without a teaching qualification.

Did you know?

All teachers in England and Wales state schools have to be registered with the General Teaching Council (GTC).

To be awarded Qualified Teacher status (QTS) by the GTC you have to:

1. Complete a period of training;
2. Complete a period of induction, known as the newly qualified teacher (NQT) year; and
3. Pass QTS skills tests in literacy, numeracy and information and communications technology (ICT).



A good teacher makes a contribution to education that goes far beyond just teaching academic subjects. Qualities which make a good teacher include:

- a liking for children and young people and enjoyment of their company;
- a good command of his or her subject;
- good communication skills;
- creativity; and
- enthusiasm and a satisfaction in sharing this enthusiasm with young people.

Mike Pennington

Primary School Teacher, Shetland

Profile

I gained a degree in ecology from Loughborough University in 1983. I began working at bird observatories, initially in Kent, where the scarcity of birds was made up for by the plants and my introduction to moth-trapping. In 1986, I came to Fair Isle, where I developed a common ecological fascination – islands. I found my niche on Unst, an island small enough to know intimately, yet big enough to keep coming up with surprises.

I was fortunate to discover that I enjoyed work that brought me into contact with schools and I was encouraged to do a Postgraduate Certificate in Education, which I gained in 1991. I now teach in the local primary school on Unst, the locality of my choosing. My preferred classes are upper primary, where the children have some maturity without the cynicism of the teenager.

While I try to emulate the broad interests of the old-time naturalist, my most 'significant' contributions are, perhaps, with insects and birds. I helped form the Shetland Entomological Group in 1992, and I was senior author of The Birds of Shetland, which was published in 2004. There is still the sense of breaking new ground in such a poorly-worked area and we are helping to revise ideas on insect migration.

Mike says:

"I hope I enthuse my pupils with an interest in nature and help them grow up as responsible and informed guardians of the environment."

Alison Gimingham

Community Learning and Volunteering Manager, East Midlands, National Trust

Profile

I wanted to work in field studies from a very early stage in my career. The subjects I enjoyed most at school were biology and geography and I loved being outside and going on school trips (whether they were anything to do with field studies or not!). My degree is a BSc in ecology from Edinburgh University. It was one of the first of its kind in Britain and gave a very good introduction to a wide variety of aspects of ecology and involved lots of field work.

I then decided to go on to do a teacher training course in rural and environmental science. This was a great success and I soon obtained a job teaching biology in a large comprehensive, with special responsibility for ecology and field work.

Six years later I moved on to teach ecology field work full time at the Cranedale Centre in North Yorkshire. I was in heaven! I loved being outside whatever the weather, I loved teaching pupils who were fascinated by the new worlds they were discovering, I loved designing new projects and finding new sites to visit, and I loved collecting data and helping students to analyse it and understand it. I also loved the rare glimpses of something really special, those treats that you only get if you are out in the field a lot.

After nearly ten years in North Yorkshire, I decided it was time to move on and I obtained the post of Director at Kindrogan Field Centre in the Highlands of Scotland. In addition to work with school pupils, Kindrogan provides specialist courses for adults and is involved in professional training for countryside staff. Being at the forefront of environmental education in Scotland was challenging.

A move south a few years later, due to my husband's career, gave me an opportunity to work for the National Trust as a Regional Education Co-ordinator, developing a wide spectrum of educational activities, formal and informal, for all age groups, ranging from ecological work in the Peak District to art and heritage projects in large mansions. I am now also involved in working with volunteers (*e.g.* room stewards, outdoor wardens, gardeners, photographers and researchers), helping properties develop sustainable links with their local communities and developing interpretation for visitors. The scope is enormous and the challenge of working on such a large scale is very exciting.

Finding a Job

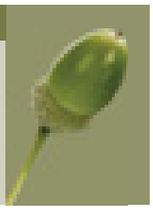
An ecology degree provides a good education, as it equips people with a broad range of transferable skills and knowledge relevant for many careers, not all of which are primarily in ecology. Options are degrees in ecology or biological subjects, or modular degrees containing elements of ecology. A wide variety of other relevant training exists. It is best to approach careers advisors or specialist teachers about courses, but the final section of this booklet gives some sources of information. Remember that during your career you may need to retrain.

These are steps you can take towards finding a job once you are academically qualified:

- Produce a well written and neatly laid out CV.
- Take advantage of the student membership schemes of the BES and the IEEM, as our conferences and special courses provide opportunities to meet professionals, gain skills and acquire knowledge to improve your employment prospects.
- Keep yourself informed about current issues, ideas and developments in the fields of ecology and environmental management.
- Spend time as a volunteer – natural history societies, The Wildlife Trusts and other voluntary conservation organisations offer many opportunities, including help with identifying plants and animals, chances to contribute to structured surveys, and management work on nature reserves.
- If you are considering a job requiring taxonomic skills, take yourself on short courses at field centres and/or obtain one of the Identification Qualifications (IdQ) offered by the Natural History Museum, London.
- Learn to drive.
- Develop your computer skills by taking short courses or training yourself in the use of word processing packages, databases, spreadsheets and geographical information systems (GIS).
- As well as consulting job centres, search the national press (e.g. *New Scientist, Nature, The Guardian, The Times Educational Supplement, Farmers Weekly, Horticulture Week*), local newspapers, the Web and other sources listed in the *Useful Contacts and Publications* section for advertised jobs.
- Approach possible employers and find out more about the work they offer, the qualifications they require and the people they employ.

Did you know?

Many courses in taxonomy and field skills have reduced rates for students, and there are a number of grants available through various societies that enable students to access these courses.



Producing a well written CV

A CV and covering letter are the only pieces of evidence a prospective employer will have when they are recruiting for posts. For many posts within the environment sector there is a great deal of competition. Employers will sort through CVs at a relatively superficial level to remove the majority of applicants before taking a closer look at potential interviewees. Getting past this first phase is crucial and CV presentation has a large role to play.

There is no standard format for a CV and each employer will have a different set of preferences, but there are some general features that are common to successful CVs:

- *Good presentation and formatting*
  Including good quality paper and a format that is balanced, avoiding large spaces of white paper or crowded sections. Check spelling as all CVs should be typed and all programmes now include spell and grammar checking, however, don't rely on spell checkers as they don't identify all mistakes.

- *Appropriate language*
  Assessing language is an essential tool in determining the communication skills of a prospective employee. Language should communicate the information clearly and concisely.

- *Essential details are included*
  Complete contact details include postal addresses, email addresses, appropriate telephone numbers you can be reached on.

- *Tailored to the application*
  Applications which reflect the job description and person specifications will be more successful than a general CV.

- *No chronological gaps*
  Chronological gaps shouldn't happen, applicants who are volunteering or taking a gap year (not in education or paid employment) are still gaining experience and skills.

- *Qualifications are grouped*
  By the time an applicant is in the position of writing a CV they have gained a number of qualifications and making sense of these is essential.

- *Up to date*
  Whether this is including modules studied at Higher Education or professional development undertaken in previous employment.

- *Relevant detail is included*
  Even if previous work is not at first relevant, showing that "office work" included responding to clients queries demonstrates transferable skills.

- *Up to date referees*
  As a recent graduate, referees can include course supervisors, others should include current or most recent employers.

- *Personal*
  Prospective employers look for evidence of a range of skills, which are not always demonstrated through educational or employment experience. Where relevant, personal information demonstrating these skills should be included.

- *Arrives on time!*
  Preparation of a CV takes time but employers are not likely to consider any CV that arrives after the advertised deadline no matter how good it might be.

Career Progression

Career progression begins with the selection of an undergraduate course and continues in the workplace as a programme of continuing professional development (CPD) and on the job learning. Employers expect graduate ecologists to have gained various skills from their education, particularly experience of basic field ecology skills and common survey techniques. Students interested in pursuing a career as a professional ecologist, will find it worthwhile looking at possible university course modules and gauging the amount of practical field work involved. If the course has a high enough content of fieldwork it will provide the opportunity to learn the relevant field skills that are required by employers of ecologists and environmental managers.

The form this field work takes may vary according to the stage of the course and resources available. It is expected that the following would all be included:

- gathering data in a real environment using industry standard techniques;
- analysis of the data using industry standard methodology;
- taking part in study tours, projects, case studies, using real examples of conservation interest to aid and develop learning;
- gathering or observing specimens of fauna and flora in their natural habitats and learning the skills to identify them accurately; and
- learning how to predict the composition of a habitat from the observation of good quality examples from similar habitats.

Students may choose to supplement this field work by taking part in voluntary activities which achieve the same ends, *e.g.* assisting with BSBI recording will enhance species identification skills, and helping local Wildlife Trusts to conduct habitat or biodiversity surveys will give the opportunity to practise the skills learned on the course.

Once qualified, ecologists and environmental managers possess a wide range of knowledge and skills; the degree to which these are applied defines the competence of an individual and therefore the ability to progress their career.

Membership of a professional body can be regarded as an endorsement of an individual's ability to practise within their given sphere. For ecologists and environmental managers, the professional body is the Institute of Ecology and Environmental Management (IEEM). A range of criteria must be met in order to qualify for membership of IEEM and as your competence increases throughout your career so can your level of membership.

After studying ecology or environmental management, students will have gained a general understanding of ecological themes and a basic level of competence. This level is equivalent to Graduate IEEM membership.

Graduates employed in a relevant job gain working knowledge of one or more aspects of ecology and ecological management; this is operational competence. It is considered that it takes at least two years to gain operational competence. Once achieved this is equivalent to Associate IEEM membership.

Once a high enough level of proficiency has been developed, enabling independent work to be undertaken within that sphere, professional competence will be gained. The ability to provide advice and guidance to others is a further hallmark of this competence. Professional competence assumes both basic and operational competence and at least four years of application in a professional capacity. This corresponds to full IEEM member status.

With an industry as rapidly changing as ecology and environmental management there is a constant requirement to keep up to date with new legislation and different ecological techniques and methods. IEEM has an annual requirement to carry out CPD, which means improving your skills and knowledge throughout your career. This CPD can consist of attending training workshops and conferences, project experience, postgraduate courses and distance learning, private reading or technical research.

Useful Contacts and Publications

The organisations mentioned previously in this booklet can supply further details about their roles and the opportunities they provide for employment. Universities and most of the NGOs and statutory organisations have websites. The following list includes more contacts which could be of use when job hunting.

Organisations

- *Countryside Jobs Service*
  This organisation publishes *The Countryside Jobs Service*, a comprehensive weekly list of jobs available from a wide range of employers. A 15 week subscription costs £20 and the journal is available in many university careers libraries. The jobs are also advertised on the website. *The Countryside Jobs Service review* is published annually and gives a summary of jobs advertised during the year.
  Website: www.countryside-jobs.com

- *Environment Council*
  The Environment Council is a charity dedicated to enhancing and protecting Britain's environment through building awareness, dialogue and effective solutions. It produces a range of reports and careers information.
  Website: www.the-environment-council.org.uk

- *Environmental Data Services*
  Environmental Data Services (ENDS) publishes the *Directory of Environmental Consultants* and also a list of jobs in the environment, which is updated weekly. These are both available on the ENDS website. ENDS publishes the *ENDS report* every month, which also advertises jobs and is available in some university libraries.
  Website: www.ends.co.uk

- *Royal Town Planning Institute*
  The Royal Town Planning Institute publishes a weekly journal *Planning for the natural and built environments*, which is available to members and is sent to all universities that run RTPI accredited courses in planning. The jobs advertised in the journal appear online at *www.planning.haynet.com*
  Website: www.rtpi.org.uk

- *Vacation work*
  Vacation work provides a number of publications for students in the environment sector, overseas and the "working with" series.

Volunteering Information and Opportunities

Information and opportunities for students on volunteering or gaining work experience can be found on the following websites:

www.btcv.org
www.crac.org.uk/sis
www.do-it.org.uk
www.morethanwork.net
www.nationaltrust.org.uk
www.timebank.org.uk
www.wildlifetrusts.org
www.work-experience.org

Did you know?

Student volunteers contributed around £42 million to the economy in 2005 (Hobsons).

Some websites that advertise jobs

www.countryside-jobs.com
www.ejscotland.info
www.ends.co.uk
www.environmentjob.co.uk
www.environmentjobs.co.uk
www.environmentpost.co.uk
www.graduatelink.com
www.ieem.net
www.jobs.ac.uk (for universities and research)
http://jobs.guardian.co.uk
http://jobs.planningresource.co.uk
www.just4graduates.net
www.milkround.co.uk
www.netjobs.co.uk
www.rgs.org (Royal Geographical Society – look in about us/jobs)
www.tes.co.uk

Other publications

Council for Environmental Education. 1996. *Courses and training in environmental education.* www.cee.org.uk

Natural England. Regularly updated. *Career pack.* www.naturalengland.org.uk

Institute of Biology. 1999. *A career with biology. An introductory guide to the range of jobs using biology.* 3rd ed. www.iob.org

Institution of Environmental Sciences. 1995. *The environmental careers handbook.* 2nd ed. Online at www.environmentcareers.org.uk

Jenkins, T. and McLaren, D. 1994. *Working future? Jobs and the environment.* Friends of the Earth. www.foe.co.uk

McCarthy, T. ed. 2005. *Environment business directory.* (This is updated annually and lists local authorities and other public sector organisations, environmental charities and environmental consultancies offering jobs in ecology or environmental management.) www.gee.co.uk

Royal Geographical Society. 2000. *Exploring the world of work: geography and careers.* www.rgs.org

Royal Society for the Protection of Birds. 1997. *Careers in conservation.* RSPB, Sandy. www.rspb.org.uk

Scottish Natural Heritage. 1998. *Jobs and the Natural Heritage. The natural heritage in rural development.* www.snh.org.uk

General information

www.Science Careers.org provide excellent careers information via a series of "how to" guides across all aspects of science and general advice on CV writing, interview skills and crossing the academic-industrial divide.

www.get.hobsons.co.uk provides independent graduate careers guides which are objective and unbiased. They regularly survey student and employer communities to provide an overview of employment markets.

www.prospects.ac.uk provides a series of case studies and detailed information on a range of careers including ecology and environmental sciences.

www.environmentcareers.org.uk provides signposts for environmental jobs, placements, work experience, volunteering and courses.

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www.britishecologicalsociety.org

www.ieem.net