



**Institute of Ecology and
Environmental Management**
Naturally Professional

Closing the Gap:

Rebuilding ecological skills in the 21st Century



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Introduction

Environmental commentators may come to regard the current period as a watershed in the history of biodiversity protection. Missed targets to halt biodiversity loss as part of Countdown 2010, the need to restart economic growth, the continuing impact of global warming and global population growth all provide a gloomy backdrop to nature conservation. Yet public interest in the environment has never been greater. Landmark government science has established how our health, well-being and prosperity depend on our natural capital.

In 2010 the United Nations published the final report of *The Economics of Ecosystems and Biodiversity Study* (TEEB)¹. The presentation of the study's findings to the UNEP COP10² meeting in Nagoya in October 2010 renewed the determination of many governments to take greater account of environmental protection. Policy development is highly dynamic, evidenced by two important environmental White Papers³ from the Department for the Environment, Food and Rural Affairs (Defra) and similar policy statements from the devolved administrations⁴, and the UK National Ecosystem Assessment has exposed the need to better understand and protect ecosystem functioning.

These and other environmental issues now combine to create an unprecedented urgency in the language of governments and businesses across the globe about the need to manage the world's natural environments from a perspective of understanding, evidence and confidence in our actions. However, behind this new sense have been persistent and growing concerns that, at a time when arguably the demand for ecological skills and knowledge has never been greater, those exact same and now critical skills are in decline. If real, such a skills deficit could undermine the implementation of key policy and our capacity to protect our environment and our future.

Concerns expressed across the entire community of providers and users of ecology were, until recently at least, mostly anecdotal and opinion-led rather than evidence-based. In 2010 the Environment Research Funders' Forum (ERFF⁶), backed by Defra and a host of UK statutory sector organisations, published *'Most Wanted'*, a report on the postgraduate skills requirements for the environment sector⁷, which identified 15 critical environmental skills that it

considered to be in short supply in the UK. Now a report of research commissioned by the Institute of Ecology and Environmental Management (IEEM), *'Ecological Skills: Shaping the profession for the 21st century'*⁸, has produced further detailed evidence that ecological skills in the UK are in such short supply that, if they are neglected further, they could seriously undermine our capacity to deliver the same environmental mandate that has become critical to us all.

The Research

The research, commissioned by IEEM and undertaken by The Management Standards Consultancy, was built upon initial IEEM in-house research and information and involved the following research methods:

- a literature review;
- analysis of survey responses from practising ecologists and environmental managers at all stages of their careers, employers and graduates;
- a review of continuing professional development records from IEEM members;
- semi-structured face-to-face and telephone interviews with key stakeholders; and
- a key stakeholders workshop to review the initial findings and identify options to address the issues.

The design of the research ensured that the effects of the length of experience of the ecologist or environmental manager concerned, the broad ecosystem types in which the profession operates (*i.e.* marine, freshwater, coastal and terrestrial) and the employment context (*i.e.* land/sea management, research, public sector, consultancy, industry and teaching) were all accounted for in the analysis of the results.

Key Findings

Evidence gathered and analysed by the consultants produced some key findings, including evidence of a continuing skills gap and skills shortage. There are specialist skills gaps and skill shortages in:

- species identification, especially of invertebrates, fish and lower plants, balanced against the specialist requirements for these taxa;
- ecological survey, sampling, data assessment, evaluation and monitoring skills for fish and invertebrates;
- Ecological Impact Assessment (EclA) techniques across a range of habitats;

¹ TEEB (2010) *The Economics of Ecosystems and Biodiversity: Mainstreaming the Economics of Nature: A synthesis of the approach, conclusions and recommendations of TEEB*

² UNEP's 10th meeting of the Conference of the Parties on the Convention on Biological Diversity.

³ Defra (2011) *The Natural Choice: Securing the value of nature* HM Government White Paper. HMSO and the forthcoming Water White Paper due to be published in 2011.

⁴ The Welsh Assembly published 'A living Wales – a new framework for our environment, our countryside and our seas' in 2011. The Scottish Government's Wildlife and Natural Environment Bill completed Stage 3 in March 2011. The Northern Ireland Executive has recently consulted on a new Environment Strategy.

⁵ UK National Ecosystem Assessment (2011) *The UK National Ecosystem Assessment: Synthesis of the key findings* UNEP-WCMC, Cambridge

⁶ The Environmental Research Funders' Forum has now merged with the Living With Environmental Change Partnership

⁷ ERFF (2010) *Most Wanted: Postgraduate Skills needs in the Environment Sector*. NERC

⁸ The full research report can be downloaded at www.ieem.net

- Strategic Environmental Assessment (SEA) techniques;
- habitat creation, restoration and management in marine, coastal and upland environments; and
- techniques to control the spread of invasive species and wildlife diseases.

In addition:

- there are clear knowledge gaps amongst practising ecologists and environmental managers regarding the application of environmental economics and techniques for the valuation of ecosystem goods and services;
- freshwater, coastal and marine systems and processes have been less studied and are poorly understood in comparison to terrestrial systems;
- understanding of the application of spatial planning, as it relates to environmental planning, is weak;
- knowledge of mitigation techniques is poor across a wide range of habitats;
- understanding of environmental legislation and its policy implications is weak in some employment sectors; and
- microbial ecology is poorly understood, especially in relation to biosecurity and ecosystem processes.

However, balanced against these identified skills gaps and skills shortages are some apparent strengths in relation to, for example, species identification of mammals, reptiles, amphibians and higher plants together with woodland and lowland grassland habitat management and restoration techniques. The commitment to continuing professional development is high amongst the profession.

Implications

The findings support previous studies that have, for example, identified a worrying reduction in freshwater ecology research capacity in the UK⁹ and yet action has still not been taken to address the decline. Of further concern are the significant cuts that have taken place over a number of years to ecologist staffing in the UK's statutory agencies responsible for ecological research, knowledge-exchange, innovation and legislative compliance.

In assessing the consultants' findings IEEM is mindful of the impact that the deficits in knowledge and skills will have on various governments' policy aspirations at all levels, in particular in implementing the ecosystem service agenda, achieving the 2011-2020 Aichi Biodiversity Targets, and compliance with EU environmental legislation. Table 1 exemplifies how a lack of the necessary knowledge and skills could compromise effective delivery of these goals.

Table 1: Some examples of the potential consequences of the identified knowledge and skills gaps

Research findings	Potential consequences
Poor understanding of freshwater systems and processes	<ul style="list-style-type: none"> • Failure to comply with the EU Water Framework Directive. • Ineffective implementation of recommendations in Defra's forthcoming Water White Paper. • Increasing species extinction rates. • Critical breakdown of water security, nutrient cycling, detoxification and pollutant disposal as ecosystem services.
Weak understanding in the statutory sector of environmental legislation and its policy implications	<ul style="list-style-type: none"> • Failure to comply with the EU Directives (e.g. Habitats and Water) and potential fines. • Failure to deliver on biodiversity targets.
Weak habitat creation skills in coastal and upland areas	<ul style="list-style-type: none"> • Inability to deliver successful biodiversity offsetting schemes as outlined in the Natural Environment White Paper for England.
Declining skills in species identification for key taxa	<ul style="list-style-type: none"> • Loss of specialist skills leading to poor species recording, poor habitat assessment and potential species loss. • Inability to detect and interpret signals of global change. • Decrease in the quality of habitat management advice given to landowners.
Poor marine management skills and marine Ecological Impact Assessment skills	<ul style="list-style-type: none"> • Undermining of the capacity for successful implementation of recent marine legislation and the effective management of Marine Conservation Zones. • Compromise of the responsible production of renewable energy in the marine environment.
Poor knowledge and skills in controlling invasive species, biosecurity and the spread of wildlife diseases	<ul style="list-style-type: none"> • Significant impact on species loss, habitat degradation, food production and water treatment. • Rising costs of control and economic costs of failure to control.

⁹ Batterbee, R et al (2005) *A review of Freshwater Ecology in the UK*. Freshwater Biological Association 24pp.

IEEM's Response

The evidence for an ecological skills gap is compelling and alarming at a time when the demand for knowledge and skills in ecology and environmental management has never been greater. Just as the ecosystem paradigm has emerged at the heart of government thinking, a deficiency in our capacity to seize the opportunities to make real gains for biodiversity and ecosystem integrity must now be arrested and reversed.

The UK needs a comprehensive strategy to deliver the full range of required ecological and environmental knowledge and skills across the environmental professions. This must involve schools, colleges and higher education institutions, Sector Skills Agencies, training and continuing professional development providers, employers across all sectors, professional membership bodies and learned societies. It requires leadership at government level and through the appropriate agencies and bodies such as NERC, the Quality Assurance Agency, the Committee of Heads of Environmental Sciences, the Higher Education Funding Councils and the UK Commission for Employment and Skills. It also requires leadership from the profession itself, and IEEM will play a leading role in engaging with partners to drive new initiatives and seek robust solutions.

The strategy should include:

- creation of a government-supported multi-partner Task Force to oversee delivery of the strategy, and to monitor progress against current and future needs;
- renewed commitment to the promotion of ecology and environmental understanding at primary and secondary school stages both to improve perception of the industry and to raise awareness of the range of career opportunities;
- development of a detailed competency framework as an ongoing career planning tool to guide practitioners in the knowledge, skills and applications requirements for a range of ecologist and environmental manager roles¹⁰;
- engagement with higher education institutions and IEEM accreditation of their under- and postgraduate programmes and postgraduate research strands that deliver the required knowledge and skills;
- improvements in careers advice and guidance to market the knowledge and skills needs and promote links to employment opportunities;
- mechanisms to promote and support the acquisition of specialist technical knowledge and skills;
- investment in high quality and accessible training programmes that target identified skills gaps and shortages;
- assessment and certification of knowledge and skills as part of continuing professional development;
- engagement from employers in the support and delivery of career structure, on-the-job training and training programmes; and
- recognition and accreditation of the specialist knowledge and skill requirements of the profession in order to raise standards and drive self-improvement.

What Needs to Happen Now

IEEM is calling on the UK Government and devolved administrations to commit policy and funding support to develop and take the strategy forward. Policy support is required to promote the importance of adequate career recruitment, education and training for ecologists and environmental managers across all the ecological disciplines, but especially in those areas identified as critical weaknesses. A multi-partner Task Force, established by Government and including representatives from the devolved administrations, the Department for Business, Innovation and Skills and Defra, should be established to oversee the implementation of the strategy and monitor progress. IEEM, as the leading UK professional body for ecologists and environmental managers, is committed to helping to deliver and/or facilitate actions identified in the strategy in the belief that this is imperative for society and for nature.

IEEM recognises that implementing this strategy will require significant government support as well as an entrepreneurial approach from key stakeholders and partners. Funding is required, potentially through the reallocation of existing resources, to cover project management, the input of specialist skills and stakeholder engagement. However, IEEM believes that delivering the strategy will be a significant step towards achieving major policy objectives as well as future-proofing the longer-term path to environmental sustainability. The question for governments, industry leaders and employers is not whether we can afford to do this but rather 'How can we afford not to?'

The full Ecological Skills Project report is available for download at www.ieem.net

IEEM is interested in talking to government departments, potential partner organisations and businesses who recognise the imperative to address the ecological skills issue and are interested in working with us to develop and implement effective solutions. For further information or to discuss the Ecological Skills Report please contact:

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The Institute of Ecology and Environmental Management (IEEM) is the professional body for ecologists and environmental managers in the UK and beyond. It was formed in 1991 and is a recognised advocate of professional standards and competences for all those working to protect and enhance biodiversity.

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¹⁰ IEEM has already commenced work on developing the higher level Knowledge, Skills and Applications Framework produced as part of this research, which identified the core competencies for ecologists and environmental managers. Input from other stakeholders would be welcome.