



# **FIELD ECOLOGY SKILLS GUIDE**

Institute of Ecology and Environmental Management  
*Promoting and Supporting Professionalism in the Environment*

# INTRODUCTION

Andrew Pullin's article (In Practice Number 44: Addressing the Skills Gap) included a colour-coded 'Survey Skills Pyramid', which separated biological survey skills into levels of competence (Figure 1). The competence levels covered all stages of experience from beginners to experts (such as national referees). The pyramid provided an effective guideline for the development of survey skills and provided details for the expected level of experience required to progress from stage to stage. The pyramid provided the IEEM Training and Career Development Committee with a framework that could be adapted in order to match the levels of field ecology skills competence to education and career progression. The outcome is the Field Ecology Skills Guide, which has been separated into two components; education and career progression.

Career progression begins with the selection of an undergraduate course and continues in the workplace as a programme of continuing professional development and experiential learning. Employers expect graduate ecologists to have gained experience of basic field ecology skills and common survey techniques. For students interested in pursuing a career as a professional ecologist, it is worthwhile to compare the curriculum of each university course with the level indicators provided in Table 1. If the course matches the level indicators it is likely that the course will provide the opportunity to learn the field ecology skills that are required by employers of ecologists and environmental managers. It is recognised that each higher education institution will have specialist skills and a research portfolios, which influence the curriculum of courses. However, these guidelines are designed to be indicative rather than prescriptive.

Career progression for a professional ecologist is usually linked to the development of a range of skills including field ecology skills. At each stage of career progression it is expected that the ecologist would be able to demonstrate a level of competence in field ecology skills. The levels indicators for field ecology skills that are described in Table 2 are considered to be appropriate to each of the stages in career progression. Obviously, each employer will have slightly different views with regards to the importance of developing field ecology skills, depending on the type of work undertaken. However, the level indicators have been developed as a consequence of consultation with a range of employers and there appears to be a fairly consistent demand for highly skilled field ecologists within the sector. In addition, it is often the case that experienced field workers hold senior positions in many organisations. The use of titles for each career level in Table 2 were selected because it is virtually impossible to provide equivalent titles for ecologists, given the diversity of employment structures within the sector.

This guidance document was written by Mark Woods in conjunction with IEEMs Training, Education and Career Development Committee, 2007.

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Table 1. Field Ecology Skills: Education Level Indicators

Education Level	Field Ecology Skills: Level Indicators
<p><b>Post-Graduate Studies</b></p> <p>Master of Science Degree or equivalent</p>	<p>Students should have a particular interest or 'leaning' towards one or more taxonomic groups. Post-graduate studies should enable students through structured and mentored studies to develop field skills at a level, which is close to, or equivalent to that of a professional Ecologist.</p> <p><b>Students should be able to:</b></p> <p>Demonstrate appropriate selection of survey methods relevant to the study requirements.</p> <p>Demonstrate competent fieldwork techniques for Phase 1, 2 and 3 surveys.</p> <p>Demonstrate competent recording techniques and analysis of field data relevant to the study requirements.</p> <p>Develop specialist taxonomic skills by study of at least 2 taxonomic groups by formal study or supported research.</p> <p>Demonstrate external activities with appropriate recording groups or professional organisations (membership of relevant recording societies).</p> <p>A habitat or ecosystem specialist would be expected to identify the characteristic or indicator species and recognise less familiar species and 'critical' genera.</p>
<p><b>National Qualification Framework Level 5</b></p> <p>Bachelor of Science Degree</p>	<p>Carry out surveys of simple habitats and have the necessary field skills required for employment as a Junior Ecologist, or equivalent post, such as an Assistant Conservation Officer for a Local Authority or non-governmental organisation.</p> <p><b>Students should be able to:</b></p> <p>Identify common plants (dominants or constants, including where relevant grasses &amp; sedges) in order to map habitats and identify standard habitat types.</p> <p>Identify common and indicator species from one or more taxonomic groups (preferably a group containing one or more protected species).</p> <p>A habitat or ecosystem specialist would be expected to identify the characteristic or indicator species and be familiar with some of the less familiar species or 'critical' genera.</p>
<p><b>National Qualification Framework Level 4</b></p> <p>Higher National Diploma Foundation Degree</p> <p>NVQ Level 4</p>	<p>Carry out surveys of a range of simple habitats and have a range of field skills required for employment as a Junior Ecologist, or equivalent post, such as an Assistant Conservation Officer for a Local Authority or non-governmental organisation.</p> <p><b>Students should be able to:</b></p> <p>Identify common plants (dominants or constants, few grasses &amp; sedges) in order to map habitats and identify standard habitat types.</p> <p>Identify common species from at least one other taxonomic group (preferably a group containing one or more protected species).</p> <p>A habitat or ecosystem specialist would be expected to identify most of the characteristic or indicator species and be familiar with a small number of the less familiar species.</p>
<p><b>National Qualification Framework Level 3</b></p> <p>BTEC National Diploma Year 2</p> <p>C&amp;G Advanced National Certificate</p> <p>NVQ Level 3</p> <p>A Level</p>	<p>Carry out simple, unassisted surveys, or provide assistance for more complex survey work.</p> <p><b>Students should be able to:</b></p> <p>Identify and label the features of a taxonomic group required to make a successful identification of a species (or identify the common organisms within a community type, such as grassland or a rocky shore).</p> <p>Use simple keys (such as FSC AIDGAP Guides) to identify the common species of more than one family.</p> <p>Construct a simple dichotomous key for a group of species (can be from the same or different taxonomic groups).</p>
<p><b>National Qualification Framework Level 2</b></p> <p>BTEC National Diploma Year 1</p> <p>C&amp;G National Certificate</p> <p>NVQ Level 2</p> <p>AS Level</p>	<p>Contribute to field work and demonstrate competent data collection and collation.</p> <p><b>Students should be able to:</b></p> <p>Recognise a range of taxonomic groups to family level.</p> <p>Identify a limited number of common species within a particular group or habitat (e.g. trees or butterflies).</p> <p>Demonstrate effective use of a simple key (with supervision) to identify organisms to species level.</p>

Progression is based on relevant sequential studies starting at Further Education and ending at a Post-graduate qualification. However, many students will enroll on Level 3, 4, 5 and exceptionally post-graduate courses without previous experience of taxonomic field skills. It is recognised that achievement of the required level by inexperienced persons will be more difficult to achieve and therefore further training may be required by a programme of Continuing Professional Development.

Table 2. Field Ecology Skills: Employment Level Indicators

<b>Employment Level</b>	<b>Identification</b>	<b>Classification</b>	<b>Interpretation</b>
<b>Principal Ecologist</b>	Demonstrate specialist knowledge of a taxonomic group or habitat type and identify all relevant species within that taxonomic group or habitat type.	Design, supervise and mentor complex and large geographical scale ecological surveys, which are fit for a specific ecological purpose.	Analyse and interpret survey data for assessment of ecological impacts at regional and national level.  Present evidence at Public Enquiries, government committees and reviews.  Formulate ecological policy and strategy.
<b>Senior Ecologist</b>	Identify all species (including a limited number of critical species) of a taxonomic group, or nearly all species within a given habitat type using appropriate aids.	Carry out an NVC survey or equivalent, of any biological community.  Design, supervise and mentor more complex, site-based and local ecological surveys, which are fit for a specific ecological purpose.  Support formulation of ecological policy and strategy.	Analyse and interpret survey data for assessment of more complex site-based ecological impacts.  Analyse and interpret survey data for assessment of ecological impacts at local level.  Prepare evidence for Public Enquiries and statutory committees and reviews.  Support formulation of ecological policy and strategy.
<b>Ecologist</b>	Identify all species (or families for specialist taxa) of a taxonomic group, or most species within a given habitat type using appropriate aids.	Carry out an extended Phase One survey.  Carry out an NVC survey or equivalent of a wide range of communities.  Design and implement surveys, which are fit for a specific ecological purpose.	Prepare an application for protected species license  Analyse and interpret survey data for assessment of less complex ecological impacts.
<b>Junior Ecologist</b>	Identify common or indicator species using appropriate aids.	Carry out habitat mapping (Phase One and/or Broad Habitats).  Carry out basic and standard survey techniques such as a population census of non-critical taxa.	Carry out basic data analysis and interpretation in relation to recognised frameworks (For example, Phase One or BMWP results).  Contribute to preparation of application for a protected species license.  Apply a simple ecological evaluation system such as Ratcliffe's Review.

NB. Recognition of the role of a specialist ecologist is essential. Some ecologists will be developing specialist skills (through research or personal interest), often at the expense of wider knowledge and skills, particularly if protected species are involved.

**Figure 1. The Applied Field Taxonomy Skills Pyramid**

Blue = ideal minimum professional level – skills are cumulative up the pyramid

Green = recorders / field surveyors with national status

Outstanding – good national referee – may write monographs, review taxonomic groups, supervise research students' projects on species

Excellent ID skills – likely to be commissioned nationally for surveying a particular group. Likely to publish. Would probably keep a reference collection.

Would be expected to record at least 75% of their taxa within a site

Minimum level for teaching professional ID courses.

Very good ID skills – in one group or more – more-or-less totally reliable for a site survey for that group – would expect to identify any rare species or hybrids or take vouchers for ID.

Would be expected to know about legislation and automatically have appropriate licence.

Minimum level for agency employee or consultant and for NVC. Minimum level for FSC associate tutor for non-credit teaching

Good ID skills in one group – could be commissioned to survey a site for a particular taxonomic group (breeding birds, dragonflies, amphibians, most vascular plants but may miss sub-species and hybrids). Member of relevant recording society. Should automatically submit records.

Ideally, schemes and societies should aim for this as the minimum for active recorders and VC recorders

Reasonable ID skills – common birds, butterflies, some flowering plants, but few grasses or sedges – an improver. Should be aware of relevant national recording society. May be a member. May submit records locally.

Minimum level for FSC tutor. Minimum level for a recorder to have their records accepted. Phase 1 survey level

Some ID skills – can ID common butterfly species, for example but not capable of producing a site list. May have attended one or two ID courses but not familiar with collecting and refereeing of voucher specimens. Unlikely to be a member of relevant recording society although may be a member of a local recording group.

Can include the village expert and may lead informal walks

Very few ID skills – can tell it's a butterfly or a dragonfly, that's all. Hasn't attended any sort of training course in identification, but intends to work/record in that area. Not a member of recording society. Probably unaware that they are at this level but would like to be at one of the above levels.

General populace with no current engagement in natural history