Institution: Edge Hill University

Unit of Assessment: 17 – Geography, Environmental Studies and Archaeology

a. Overview

Research in this UoA is organised into two research groups: the *Environmental Processes and Change Group* (EPC), based mostly in the Department of Geography and the *Ecology Group* (based in the Department of Biology). The EPC, led by **Richardson**, includes Professor **Worsley**, a reader (**Bedford**) and a team made up largely of early career researchers (**Delgado-Fernandez**, **Maynard**, **Rowson**, **Sangster**, Jones, C. and Jones, S.). The interdisciplinary research of the Group is concentrated around two main themes: (i) the investigation of environmental/climatic change and response at different timescales, using a range of approaches including both documentary and sediment-based evidence, and (ii) contemporary environmental processes, including coastal processes and geomorphology, carbon cycling within potential carbon sinks and stores, catchment and fluvial processes and catchment management; and atmospheric particulate pollution. The Ecology Group is led by a reader (**Ashton**) and includes a mixture of established researchers (**Bedford**, **Dean**, Lucas, Powell, Strode), early career researchers (**Oxbrough**, **Voller**), a post doc (Tejero) and eight PhD students (Bugg, Lyons, Barker, Sullivan, Champion, Dallimore, Rycyk, Devaynes and Hacking). The Ecology Group incorporates considerable taxonomic expertise across various groups (vascular plants and invertebrates). This is utilised to address wider conservation-based problems including the long term changes to grasslands and the impact of grazing. Molecular tools are also utilised to investigate landscape scale variation and taxonomic questions. The staff in both research groups are supported and encouraged to develop research activity intended to make a significant theoretical and empirical contribution to the enhancement of scientific knowledge which is central to society, and the resolution of practical problems in regional, national and international contexts.

b. Research strategy

Since 2008, the unit's strategy has been to grow its research by i) producing more, high quality outputs, ii) appointing and supporting new research-active staff and iii) developing the profile of existing staff. A second strategic development has been to expand our PGR numbers and, along with this, to enhance our research culture by increasing the opportunities for debate and exchange with fellow academics and research users. The final element in our strategy has been to invest in our buildings and equipment to support a dynamic and sustainable research environment.

This strategy has delivered a growth in research with particular achievements of the UoA being to: (i) make a series of contributions to the understanding of the scale and magnitude of Lateglacial and Holocene climatic and environmental change (**Bedford**, **Richardson**); (ii) contribute to the understanding of coastal dynamics and change along the Sefton Coast, NW England and inform potential management practice (**Worsley, Delgado-Fernandez**); (iii) address a series of vascular plant taxonomy questions (**Ashton, Dean**) and (iv) utilise bryophytes to examine biogeographic questions related to conservation (**Ashton**). Callaghan (PhD student, completed 2009) and **Ashton** (2008) modelled various climatic parameters as indicators of bryophyte species richness in order to identify areas where gaps in richness existed.

To address the problem of an ageing research community, since 2010 the University has invested heavily in the recruitment of staff, especially those early in their careers. This strategy has both enhanced existing strengths and yielded a significant increase in the range of the research undertaken. It is reflected in the increase in the number of staff submitted (relative to 2008) and the volume of peer-reviewed publications. In 2008 we had 13 such publications. In this submission 29 papers were eligible with 22 of those coming from established researchers who also submitted to the RAE. New research areas, not included in the 2008 submission, have been developed as a result of new staff appointments, including modelling and monitoring of the evolution of coastal dunes (**Delgado-Fernandez**); carbon fluxes from peatlands (**Rowson**); sustainable management of forest ecosystems (**Oxbrough**); mycorrhizal research (**Voller**); river management (**Maynard**); and pure and applied volcanology and seismic hazards (**Sangster**). The strategy will lead to a maturing of research plans leading to continued growth in the next cycle.

While research plans identify staff direction, this is continually reviewed allowing the researchers to respond to newly developing areas from external sources (e.g., **Oxbrough** and **Ashton** submitted an application for Ash dieback research) or for developing novel collaborations within the team: for instance, Strode and **Oxbrough's** recent initiation of work on malaria vector

potential spread in the UK combining Strode's malaria expertise and **Oxbrough's** invertebrate taxonomy skills. Central to our research philosophy has been active engagement with the users of our research, whether practitioners or other professionals, especially through the coastal work of **Worsley** and **Delgado-Fernandez** whose partners have included nationally: the Environment Agency, Natural England, the National Trust, DEFRA, the Marine & Management Organisation, and regionally: North West Coastal Forum, Sefton Coastal Partnership, Sefton MBC; the taxonomic and coastal work of **Ashton** who has informed practice for Natural England (NE) and the National Trust (NT) and **Bedford**'s work on analysis of Chironomid community composition in lake sediments has significantly informed recent climate reconstruction work amongst the academic community. Over the next five years our key priorities are to:

- Improve the profile of the unit by increasing substantially the volume of high quality, impact oriented, and applied interdisciplinary research of international standing and significance, through support, planning and monitoring, supporting those who are developing or have an established research profile.
- Improve the vitality and sustainability of the unit:
  - By increasing the proportion of staff who are research active and eligible for inclusion in REF2020. This will be achieved by ensuring that a successful track record in publication is an essential requirement for new posts.
  - By embedding and enhancing a research culture throughout the departments across all levels. This includes undergraduate and PG research, dissemination of the work formally and informally within and outwith the group and through vehicles such as research group meetings, conference attendance, conference hosting and publication of success.
  - By producing useful, engaged research that keeps research users at the heart by identifying beneficiaries at the outset through identification of and consultation with key stakeholders, followed by regular reviews throughout a project's lifetime.
- Increase the quantum of external funding to facilitate research from potential sources such as NERC and the Leverhulme Trust; from schemes for early career researchers such as the EPRSC 'First Grant' Scheme and the ERC Starter Grant; and from non-standard sources such as the Environment Agency and United Utilities.
- Be a destination of choice for PGRs funded through the internal GTA scheme and external funding opportunities, thereby growing the number of PGRs in the Research Groups.

Each research group is led by a senior member of staff, though membership crosses departmental lines. Research output is planned in a transparent, collegial fashion so that group members can support each other in the realisation of individual research plans: this is particularly important for ECRs who are given lower administrative and teaching loads in their first year. At the same time, a key issue is to ensure that existing staff members who are not included in this submission are supported to ensure that their research is included in future assessments (e.g., Lucas, Powell, Strode). Research performance is actively managed by the Directors to ensure that all staff meet their research targets and are given the support required. Members within the group produce an Annual Academic Return (AAR) and a medium term (3-5 years) research plan which are scrutinised by the Heads of Department and the Dean. Staff deployment decisions are informed by these plans, and the achievement of them. In order to manage the productivity of the groups more strategically, a teaching relief scheme for staff will be operational from 2013/14 for staff to pursue projects detailed in their approved AARs and medium term research plans. Where the curriculum does not offer staff the opportunity to employ their research in the classroom, curriculum development is undertaken. Staff are supported and encouraged to produce at least two 2* or higher outputs per year: league tables based upon target journals for each group have been compiled which will inform staff research plans and raise publication ambitions. To ensure that research outputs are of the highest quality, the groups will act as peer review units so that the quality and integrity of our research is maintained and enhanced and so that colleagues can be effectively advised on publication outlets. The HoD records and tracks the progress of submitted outputs. The groups identify collaborative and interdisciplinary research opportunities within the group, between the groups, and externally.

To encourage research that answers the needs of research users, each group has an impact strategy and this informs how staff design individual or collaborative projects. For example, research by **Delgado-Fernandez** into processes affecting sediment supply into dune systems is being developed through an active partnership with Natural England and the managers of the

Ainsdale SSSI where the research will be undertaken. Furthermore, research by Jones, C. into the vegetation history of Mill Wood, South Liverpool, was jointly initiated with Lancashire Wildlife Trust (LancsWT) and NE, to develop management strategies with the woodland. This will be augmented by the maintenance and development of communication with the wider environmental community, e.g., in the field of adaptation to climate change, it is anticipated that the work of **Delgado-Fernandez** on beach-dune systems will lead to excellent outputs but will also benefit the wider community and coastal managers/practitioners, both economically and socially. This work will support and add to the corpus of work identified in the impact case study by building on current partnerships and continuing with science-led management practices that enable decision makers to avoid instability on beach and dune systems. These will continue to be a first order priority, both in the UK and elsewhere, as these will play a fundamental buffering role against storm surge, wave attack, and processes resulting from a predicted future rise in sea level. Similarly PhD research (supervised by **Oxbrough** and **Ashton**) on the impact of grazing animals on the biodiversity of upland limestone grassland will directly impact upon the management of high conservation value grassland through links with the National Parks Authority and Natural England. Refinement of management practices both in number and type of stock will emerge from the study. Similarly the research supervised by **Ashton** on the floristic changes over a quarter of a century in upland hay meadows will again inform management decisions relating to agri-environment schemes.

To foster engagement with research users and peers, there are a range of guest lecture programmes, conferences and workshops involving practitioners. Recent guest lectures have included contributions from Professor Robin Davidson-Arnott (University of Guelph), Professor David Chester (University of Liverpool), Dr Toos Van Noordwijk (Radboud University, Nijmegen) and Dr Rob Thomas (British Antarctic Survey). Similarly, the Department regularly invites alumni from professional practice to attend group and departmental events. For instance ex MSc student Alex Bateson (LancsWT) has presented a talk to the department on her work. To promote accessible dissemination, research findings are translated into on-line accessible fact sheets or summaries. We also maintain a database of end-user contact details which both groups share and develop and ensure that impact is measured and recorded for future access to this data.

Growing research income is vital to the development of both research outputs and the PGR community. The groups encourage and support staff to secure internal and external research funding through a process of compulsory internal peer review system for internal and external funding applications so that the quality and integrity of our research is maintained and enhanced with a view to securing a high success rate for our bids. As part of the institutional signing off procedure, funding applications are not approved by the Head of Department unless they have been approved by departmental peer review. Each group is required to produce a short accessible staff guide detailing sources of internal and external funding. Where bids fail, there is a feedback meeting, including where appropriate, the University's Research and Enterprise Support Office (RESO), to identify areas for development and to identify possible alternative funders.

Key research themes and clusters are defined and promoted by the groups. Specifically, in the *Environmental Processes and Change Group*: **Rowson** will continue to investigate aspects of peatland carbon cycling including the effect of saltwater intrusion and water table fluctuations on gaseous and fluvial carbon emissions; **Delgado-Fernandez** proposes to use new modelling techniques and instrumentation to investigate sediment transport exchange within beach-dune systems, with the aim of developing new universal models of coastal dune evolution that can be used to model the response of beach and dune systems to potential future climate, sea-level rise and storm frequency scenarios; **Maynard** will build on previous research to investigate the cumulative geomorphological, hydrological, ecological and social impacts of micro-hydro schemes on small rivers, and the impact of channel modification on fish fluvial habitats. Ongoing research into atmospheric particulate matter source attribution and quantification in the commercial airport and military airfield environment will be continued by Jones, S. and **Richardson**; Jones, C. will continue to research stand-scale forest dynamics, potentially in partnership with conservation organisations such as NE, the NT and LancsWT; and **Sangste**r will extend her research of societal vulnerability and response to volcanic and volcano-related disasters and the implications for present day disaster planning, to studies of Vesuvius eruptions, and small islands including the Canary Islands and the Azores.

In the *Ecology Group* **Oxbrough** will develop further her studies on the impact of commercial forestry on invertebrates including incorporating management practices to maintain biodiversity.

While commercial considerations are the priority for the forestry practice, the conservation of biodiversity has become increasingly important. **Oxbrough's** research investigates how the species composition, planting and harvesting patterns can be modified to maximise invertebrate biodiversity benefits. In addition she will extend her work to look at the impact of grazing on soil dwelling invertebrates especially the *Collembola*. This will include investigating some of the ecology of this little understood group alongside dispersal patterns using molecular markers. She is also establishing a research project on urban spiders in collaboration with Professor Dries Bonte (Ghent University). This is part of a wider EU funded project investigating how the transition from rural to urban environments influences invertebrate community composition. **Voller** will maintain her research into mycorrhiza but develop this into new areas by collaborating with the work already being done in the department on lime trees. Specifically mycorrhizal associates in temperate woodlands are poorly understood particularly for closely related species. It is intended to investigate potential mycorrhizal differentiation in the closely related sympatric species, *Tilia cordata* and *T. platyphyllos* using molecular markers in new areas. Lime will also be the subject of landscape genetic studies by **Ashton** analysing the extent and character of gene flow between the fragmented populations typical of this species. Given the likely impact of climate change on dominant woodland species lime is a key organism to study given its summer temperature limited distribution. The research on the long term changes and impact of management on high biodiversity upland habitats will continue. **Dean** will continue her *Carex* section *Phacocystis* studies to address evolutionary and geographic questions within this group. The additional *Carex salina* populations found since the initial discovery of the species in the UK (Dean et al, 2008) raises questions about local or long distance dispersal. In addition the conflicting theories about the evolutionary routes within this group of maritime sedges and the associated taxonomic questions require resolving.

c. People, including:

i. Staffing strategy and staff development

Since 2008, the two departments represented in this UoA have expanded and have made the recruitment of new staff who are research-active a key strategic priority. Research interests and commitment are now fundamental considerations in the recruitment of all new academic staff. This has led to the successful appointment of a seven early career researchers (**Rowson, Delgado-Fernandez, Maynard, Oxborough**, **Sangster, Voller,** Jones) and two established researchers (**Dean,** Strode) with the potential to develop the unit's research groups, and assist in the development of research activity amongst other staff. To further this end an environment research chair will be advertised early in 2014. The age profile of research-active staff is notably young and the research environment is a dynamic one. Several recent appointments are engaged on fixed-term contracts and we will be seeking to secure such posts on a more permanent basis either by attracting additional income (e.g., grants, consultancy work, increased share of the student market) or by routine staff turnover.

Such an influx of new staff, largely those at an early stage of their careers, requires a strategic approach to their support and development. We recognise that our profile is skewed towards ECRs and that it is vital that we give them adequate support to enable them to excel equally in research and teaching. ECRs are given reduced administrative and teaching loads in the first year and are given priority with internal research support funds. They are mentored by senior staff and encouraged to participate in collaborative projects to help support them. Those who are immediately post-doctoral produce research plans to identify how they will generate quality outputs from their PhDs and to support them in creating a continuation strategy. The transition from ECRs to established researchers is also facilitated by input from Visiting Professors who advise on progression from CI to PI status. Similar support is given to fixed term appointments to ensure that they are able to compete for permanent positions whether at Edge Hill or outside.

The University has applied for an Athena Swan Bronze award and it should be observed that seven out of the eleven colleagues in the present submission are women, including Professor **Worsley**. Women have dominated recent appointments and make up 66 per cent of the submission. We recognise, however, that women are underrepresented at senior levels. To address this we are providing extended mentorship for those colleagues who wish it and the leaders of the research groups will actively monitor progress of ECRs to ensure that they are able to reach their full potential. We shall use national programmes, such as Vitae's Leadership in Action, to support staff and actively promote this with female staff. Various sources suggest that

women planning or returning from maternity leave can find opportunities diminished or the work-life balance more challenging. We will address this by phasing in women's return after maternity leave by reducing administrative tasks and teaching for the first six months.

The UoA will now capitalise on the dynamic and vibrant research environment the new staff have stimulated by continuing to embed all seven principles of the *Concordat to Support the Career Development of Researchers* in all aspects of their work and remain compliant with the *Concordat to Support Research Integrity*. While the development of ECRs is a significant responsibility, the maintenance and development of existing researchers is also important to ensure equality of opportunity to engage in research is being effectively promoted and delivered. Hence, staff development opportunities are available to all academic staff to support their research activity and attendance at national and international conferences, with funding being provided at departmental and Faculty level, as well as a University-wide Research Investment Fund (RIF). ECRs are prioritised in the allocation of RIF, with established researchers tending to be allocated such funds for pump-priming of new projects. The University has established its own *Research Capacity Building* training programme (RCB) which, in turn, is explicitly mapped onto the *Researcher Development Fram*ework (RDF) and includes methods training, guidance in developing research proposals, grant application workshops, publication workshops etc. All staff, regardless of contract, have access to the RCB, to develop research skills and become independent researchers. Less experienced staff including ECRs can also use the research mentor database to search for appropriately qualified professors and readers in the University who might help them with particular issues related to their research; the database is maintained by RESO. In order to help ECRs in the establishment of their research careers, they have reduced teaching and administration loads in their first year, and they are assigned a mentor who can provide guidance on developing their research plans. The career structure of research active staff is facilitated by an annual round of applications for readerships and professorships.

ii. Research students

The Graduate School provides generic training while departments are responsible for discipline-specific provision. All students undertake a training needs analysis annually and discuss their needs for the following year. Students are encouraged to access RCB sessions to complement other training and, where appropriate, they can bid for support to attend external events. All doctoral students are expected to participate in conferences and seminars held at EHU, and there is a competitive bursary scheme to support external conference paper presentations and other research expenses. All PGRs undertake a formal induction and training programme, and progress is monitored and supported. Research students undertake a viva voce examination with a panel including an external member to progress from MPhil to PhD, which serves as preparation for the final examination. PGR applicants are expected to have prior research experience. Progress is monitored by the supervisory team and Graduate School Board of Studies (GSBOS). Research supervisors and students complete separate annual reports on progress which are reviewed by GSBOS. All academic members of staff who will undertake doctoral supervision must attend the Annual Research Degree Supervision Training Session (run by the Graduate School) held at the start of each academic year and for staff with little or no supervisory experience, a two-year rolling training programme is provided and a policy of teaming up new supervisors with experienced ones has been developed to build supervisory capacity. Throughout, supervisors must observe their responsibilities outlined in a Research Degree Supervisor Handbook.

Development of PGRs is largely undertaken within the unit under the aegis of the PG Research Group which includes peers and supervisors. This meets monthly and includes discussion of projects to date, statistics workshops, preparation ahead of submission milestones, practice conference presentation and conference feedback. Additional lab skills are facilitated through external workshop attendance or through expertise sharing within the PGRs.

All research students present their work at the departmental research seminars and are encouraged to deliver papers at at least one international conference during their studies. This enables peer review of the highest calibre and serves to encourage and motivate students to make excellent progress and to critically reflect on their research. Alongside the Graduate School bursaries, students can bid for funds from the Department and Faculty.

We have had three completions of part-time PhDs in the census period. Part-time registrations have traditionally been the norm and typically the students have a significant presence in the department, often working as associate tutors (ATs), and contributing to the research community.

Whilst part-time registration may have some limitations, it has the advantage of attracting research students with a mature and motivated approach to their work. Part-time registrations have recently been augmented by three full-time students (Lyons, Barker, Tomkinson), funded through the institutional graduate teaching assistant (GTA) scheme. These post-graduate research projects have a clearly identifiable wider impact and this continues with the most recent projects presenting an important link between the department and practitioners. Thus far, the recruitment of GTA students via a competitive application process has been supported by internal funds provided by the Faculty which has committed to the appointment of 12 such students each year between 2012 and 2016. The aim is to expand the PGR body to generate a critical mass and provide the basis for future recruitment.

d. Income, infrastructure and facilities

Since 2008 the Environmental Processes and Change Group and the Ecology Group have generated £231,000 in research income. This includes income from government research bodies (e.g. NERC) and sources reflecting the more applied nature of the research (e.g. RSPB; Heidelberg Cement). Small funds have also been obtained for individual researchers, for instance Sullivan (a PGR) obtained £1000 from the Botanical Society of the British Isles towards her research costs. Additional funding for research has been gained internally through the EHU Research Investment Fund. This internal funding stream is available to 'pump-prime' new projects, to employ temporary research assistants to collect and process data, to provide relief from teaching, to support conference attendance nationally and internationally and for the completion of projects for which earlier funding streams have expired.

The Department of Geography (home of the EPCG) and the Department of Biology (home of the Ecology Group) are based in two recently refurbished buildings. Staff have single or dual occupancy offices while research students are accommodated 2-4 per office. All academic staff and research students have access to excellent IT facilities, including specialist GIS, remote sensing and geo-environmental software. The University computer network provides all staff with access to Thomson ISI Web of Science databases. Research activity is supported by six full-time laboratory technicians (two in Geography; four in Biology) and one part-time technician. Additional research work is carried out by research assistants funded from research awards.

The EPCG has one research laboratory which houses a range of analytical equipment. A programme of University capital expenditure has been used for both renewal of equipment and new acquisitions. The equipment base includes a Beckman coulter laser particle size analyser, Gamma Spectrometry System, Bartington Magnetic Susceptibility Meter, ASC Scientific D-2000 AF Demagnetiser, Molspin Pulse Magnetiser, Molspin Minispin Fluxgate Magnetometer, biological and petrological microscopes, and will be added to in the near future with an Oxford Instruments X-Supreme8000 XRF Analyser. Field equipment includes Gilsen, Livingstone and Mackereth corers for near-shore and lake sampling, and two Russian peat corers.

The Ecology Group has a newly equipped DNA laboratory with insectaries soon to be installed and Light microscopes including a fluorescence microscope. Shared facilities include an Analytical Chemistry Research Laboratory with atomic absorption spectrophotometers and Flame photometers, a Soil Analysis Laboratory, and a Scanning Electron Microscope.

The research governance infrastructure is overseen by the University Research Committee (URC) and its sub-committee the University Research Ethics Committee (UREC) whose responsibility it is to ensure that staff and students adhere to the tenets of the Concordat for Research Integrity, the principles of which are enshrined in the Code of Practice for the Conduct of Research and the Code of Practice for the Reporting of Research Misconduct. Regular training sessions on research ethics are provided via the RCB and the chairs of the Faculty Research Ethics Committees (FREC) are available to offer guidance to staff. The research group Directors keep abreast of University wide policies and procedures, and ensure that the group operates in conformity with them. Every effort is taken to minimise environmental impacts during field sampling through (i) careful selection of sampling sites, avoiding areas that are especially vulnerable to disturbance; (ii) limiting the amount of material collected; and (iii) restoring sampling sites to their former status, as much as is feasible, after completion of sampling, especially when sampling in vegetated areas. All researchers gain permission to undertake fieldwork/field sampling before any fieldwork is undertaken. To ensure the highest standards of health and safety in research activity, detailed risk assessments are completed before the commencement of any fieldwork or laboratory analysis. Guidance for researchers on the completion of risk assessments is available from senior

technical staff in each department, and from a University Health, Safety and Environment Officer.

e. Collaboration or contribution to the discipline or research base

The Environmental Processes and Change Group has collaborated with external organisations and partners and academic staff in other institutions in various ways. **Rowson** was a member of the scientific team on the interdisciplinary PEATBOG Project (Pollution, Precipitation and Temperature Impacts on Peatland Biodiversity and Biogeochemistry) which involved partners from Germany, Italy, the Netherlands and Sweden, and investigated the impact of nitrogen pollution and climate change on the health of peatlands. Jones, C. is a member of the Global Paleofire Working Group (GPWG) which is developing a global database of charcoal and fire records, and has submitted approximately 60 sites representing the British Isles.

Collaborations with external organisations include NE, the NT and Sefton Borough Council in investigations of coastal processes (**Delgado-Fernandez**, **Worsley**); the Environment Agency and Tyne River Trust to assess hydrological and geomorphological impacts of weir restoration (**Maynard**); the RSPB (**Bedford**); the Moors for the Future Partnership and the Environment Agency in studies of carbon budgets and peat restoration practice (**Rowson**); United Utilities to study the effects of heather burning and heather cutting on carbon cycling (**Rowson**); NE, LancsWT and the Mersey Forest in ongoing research into Holocene stand-scale forest dynamics (Jones, C); the Countryside Council for Wales and Gwent Wildlife Trust in palaeoecological studies of Cleddon Bog, Wye Valley, to inform their conservation priorities for the site; and British Airways, Flybe, Manchester International Airport, Heathrow Airport Holdings (formerly British Airports Authority), and the Institute of Environmental Assessment and Water Research (IDAEA), Barcelona, for ongoing research into atmospheric particulate pollution at airports (Jones, S., **Richardson**).

The Group collaborates nationally and internationally with colleagues at other universities and research centres including: **Rowson** has collaborated with scientists from Utrecht University, Netherlands, University of Ferrara, Italy, University of Bayreuth, Germany and Linkoping University, Sweden in investigations of the impact of nitrogen pollution and climate change on peatlands as part of the PEATBOG Project; **Bedford's** work on climate reconstruction using chironomids was a multi-institutional study involving staff from Exeter, Liverpool, Natural History Museum and Bergen; **Delgado-Fernandez** has worked with colleagues from the University of Guelph, Canada, and the University of Ulster on the measurement and modelling of coastal dune processes, and has begun to investigate the impact of extra-tropical storms on the west coast of Ireland, and the evolution of barrier-lagoon systems in NW Spain with colleagues from the universities of Cádiz and Vigo, Spain, respectively; **Maynard** has been collaborating with researchers from Durham University and Edinburgh University in a project investigating micro-hydro generation and environmental justice; **Sangster** has worked with colleagues from the University of Liverpool, University of Bedfordshire, University of the Azores and the University of Aarhus on volcanic eruptions and human vulnerability in traditional societies, past and present; and **Richardson** and Jones. S. are collaborating with staff from Manchester Metropolitan University on airport particulate pollution.

The Ecology Group has developed academic collaborations with other institutes and individuals. **Ashton** is currently collaborating on a project on lime (*Tilia*) hybridisation with Newcastle University and on *Carex* work with a member of staff at the Royal Botanic Gardens, Kew. This follows on from previous work on woodland regeneration with Open and Northampton Universities. **Dean** and **Ashton** collaborated with a Canadian government-employed agriculturalist, Dr Jacques Cayouette, during the *Carex salina* work. **Oxbrough** has established collaborative work with the University of Ghent and is developing her invertebrate forestry research in collaboration with the Forestry Commission while continuing to work with colleagues from Cork. The Ecology staff also make a wider contribution to their respective disciplines; **Ashton** is secretary of the Ecological Genetics Group (a special interest group of the British Ecological Society) and is instrumental in organising that group's annual conference. He also has organised symposia at major conferences including the International Botanical Congress at Melbourne in 2011. He is also handbooks editor for the Botanical Society of the British Isles (BSBI). **Oxbrough** has recently been guest editor of the *Forest Ecology and Management* journal. **Dean** is a council member of the BSBI. She is also ran a workshop at Edge Hill on multivariate analysis for taxonomy in June 2013 for PGRs.