Institution: Edge Hill University

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

a. Context

Environmental research at Edge Hill University (EHU) spans biodiversity, conservation, paleoclimatology, geomorphology, environmental change, coastal processes, carbon biogeochemistry, atmospheric pollution and taxonomy. Our work is most relevant to the needs of a core set of research beneficiary groups in local authorities, national government policymakers, conservation agencies and groups, environmental management agencies and environmentally aware and engaged members of the public. It is also relevant to those engaged in the development, operation and management of strategic and local infrastructure. In more detail, our research is relevant to the needs and activities of the following:

Local authority conservation teams: Our work on coastal processes helps to inform and shape the policies and practices of local authority teams (and their partners) with responsibility for biodiversity, coastal protection and management and sustainability. Users of our coastal geomorphology and environmental change work include local authorities with responsibility for coast management as exemplified by Worsley's role as Chair of the North West Coastal Forum.

Conservation policy and practice: Our research on ecology, biodiversity and taxonomy has policy and practice impacts on the work of conservation bodies, including Natural England (NE), the National Trust, the RSPB, and The Wildlife Trusts. For example, Ashton's work (in Erenler et al, 2010) identified the soil requirements if plantations on ancient woodland sites are to be successfully restored to broadleaved woodland akin to their pre-plantation state.

Major landowners and others with statutory management duties: Research on biodiversity, taxonomy, climate and environmental change has policy and practice impacts for other public sector organisations responsible for statutory management duties and major landholdings e.g. the Forestry Commission. Our work on biodiversity and taxonomy supports bodies seeking to balance a biodiversity remit alongside commercial and social pressures. For instance, the work of Oxbrough on woodland invertebrates was used to inform foresters on suitable planting approaches to enhance biodiversity.

b. Approach to impact

During the period 2008-13 we have used the following channels, mechanisms and processes in order to maximise the potential for impacts of reach and significance:

Working closely with research users in applied, collaborative work: The extensive external engagement both with fellow academics and the broader environmental community has engendered research questions and continues to do so. For instance this was the origin of the yellow sedge research by Blackstock and Ashton (see case study) and of more recent PhD projects such as that of Lyons where questions from conservation managers on the impact of grazing approaches in upland limestone habitats has led directly to a collaborative research project.

Current EHU projects involving close collaboration with end users include Delgado-Fernandez, who is using short-term experiments, remote sensing and theoretical modelling to investigate sediment transport dynamics within beach-dune coastal systems. The aim is to develop reliable modelling frameworks that can be linked to climate forecasting to provide better informed management practices of the coastal zone, against storm surges and other pressures arising from a future rise in sea level.

Engaging actively in networks: In order to facilitate the dissemination and consequent utilisation of research findings, EHU has for many years promoted the active involvement of its academic staff in appropriate academic and practitioner networks. Particular care is taken to ensure stakeholders are informed of the outcome of findings. This is achieved through formal meetings, invitation to relevant departmental talks, distribution of newsletters such as the Lime News (see *BES Bulletin* Spring 2012) alongside informal contact through face-to-face meetings on site visits, email and telephone conversation. Reach beyond traditional academic approaches has been enhanced through the Biology and Geography departmental web pages and twitter. The Biology twitter account (@BiologyEHU) includes research news while Lyons' upland grazing twitter account (@Upland_Grazing) is entirely focussed upon her research. Successful bids to the internal Research Investment Fund (RIF) now require a clear and achievable strategy for wider impact aiming to create a research environment where wider impact is an intrinsic feature of the work. Close liaison with our press office (including media training) and the development and

implementation of a media strategy in the near future will lead to a more focussed approach while keeping the strengths of the existing routes.

Committee membership and participation in working groups: To aid direct dissemination to research users, and to help shape our research questions, EHU staff are involved in local and national bodies. For instance Ashton and Dean both sit on Botanical Society of British Isles committees, while Oxbrough, Ashton and Bedford all attend local groups relevant to their research area (e.g. the Manchester Wetlands NIA group).

Recruiting researchers with a track record and/or potential to generate impact: A combination of appetite and potential for engagement with research users, or a proven track record in such activities, has been an important criterion in the appointment of new staff and will remain so. All recent appointees have brought with them new approaches to impact. For instance Oxbrough has been involved in policy groups in Ireland which bring together academic researchers and foresters with the aim of informing and modifying practice. This will be developed when research relevant to UK forestry practice has been completed. Opportunity has also been taken to employ experienced research staff to further develop and enhance EHU practice. For example Dean has been employed following her experience project managing at a large research based university.

c. Strategy and plans

The strategy of the group is to undertake research that is relevant, innovative and has a distinct application while maintaining consideration of theoretical aspects of the subject. This has been a long held philosophy and a legacy of this approach is that environmental work at the University is well regarded by those organisations with which it works. A good track record of project completion is established and the academic skills within the group are recognised as valuable by external users. The challenge is to extend the scope of the work undertaken, increase the volume of research undertaken including associated income and output, while enhancing the reputation of the institution. Achieving this strategy will require a multi-faceted approach including investment in infrastructure, investment in equipment, investment in staff and then enabling those staff to undertake high quality research of academic and wider impact. Our strategy for impact therefore has the following key elements:

Shaping and drawing upon institutional support: Maintaining and developing research activity is supported by the Research Investment Fund (RIF). This allows applications in support of particular research projects with identifiable and achievable outcomes, wider impact being a key component of such bids. A related scheme is the Graduate Teaching Assistant which funds three-year research projects alongside an expectation to deliver a fixed number of teaching hours and is determined competitively. This was introduced in 2012 and the environment researchers have successfully added three GTAs in the last two years. Existing PGR students can also apply to the Graduate Bursary scheme fund for relevant support. Support centrally comes from the Research and Enterprise Support Office (RESO) for assistance with external grant applications and engagement with research users. We will work with RESO to develop tailored guidance to staff to help them engage with external organisations more effectively. An internal University Impact conference will be used to raise awareness of good practice, funding for Impact activities and engagement with users.

New appointments: EHU recruitment policy has undergone a significant sea change in the last few years. Rather than employing staff who have primarily a teaching background and expecting a research programme to emerge, staff are now employed who are coming directly from a research background, typically post-doctoral, with an attendant expectation that their research will continue alongside their new teaching responsibilities. There is also a strategic direction to appointments, which aim to maintain existing strengths and to develop new ones. For instance the skills and experience of Oxbrough directly replace that of Bedford, while Delgado-Fernandez has further developed the coastal research initiated by Worsley. By comparison the appointments of Voller, Rowson and Maynard provide significant additional breadth to the research group. This approach to appointments will enable us to develop a stronger profile with target research users, which will be key to securing collaborative projects.

For all staff the Annual Academic Review is used as a research management, planning and tracking tool. This provides a mechanism for departmental managers to shape, advise and monitor the progress of impact and user engagement plans. It is anticipated that staff will take full roles in memberships of professional bodies, committees and editorial boards, while engaging with

research users to help identify the next generation of research questions. However it is recognised that that this cannot be achieved without support. At departmental level this is achieved by sympathetic timetabling such that staff are free to complete grant applications without the constraints of a heavy teaching load and technician support for projects, plus suitable mentoring and RESO support.

Exploiting our recent investment in research infrastructure: Infrastructure has been addressed in a £5 million building programme across the two departments. This has included provision of insectaries, a SEM and specialist research labs including DNA and analytical chemistry labs. These facilities will enable an increase in the quality of research undertaken. For instance the traditional taxonomy skills in the department will be augmented by DNA based approaches to address key environmental issues. A current example is the combination of our invertebrate taxonomy expertise within the department with the malaria vector research of Dr Clare Strode, a new appointee. This is being used to assess the current and potential mosquito species in the UK and hence assess malaria risk. In addition to academic output, one anticipated outcome is the development of an illustrated field key to widen knowledge of this group. An additional route to impact, rarely utilised by the group to date, is through consultancy. A change in the institutional approach to consultancy - which now allows retention of 60% of net fee income within the department for reinvestment in research - actively encourages engagement. The new equipment will also make consultancy work more likely, in areas such as soil analysis and diagnostic microscopy. This in turn will enhance the potential for research and increase the number of attendant stakeholders in our work.

Reflection upon Practice: A key part of strategy development is the reflection upon practice. This has led to the recognition that impact needs to be more fully incorporated into research culture, initially through the use of impact plans utilising previous good practice alongside novel approaches. Good practice to date includes methods of lay briefing such as emailed updates (e.g. lime news), twitter, end user conference attendance, workshop delivery and informal contact. Important developments to be adopted include impact plans, blogging, presentations to user groups and more formalised and structured discourse with research user organisations leading to mutually beneficial strategic decisions. It is also important to ensure mechanisms are in place that ensure work is relevant to its end. This is likely to involve a greater formalisation of the relationships with end users such as Natural England (NE) which is a major beneficiary of EHU environmental research. A model for this comes from the formal partnership developed by Worsley with Sefton Metropolitan Borough Council and others, marked by there being named groups and structures, agreed aims, working together on drawing in external funding.

Taken together these investments in buildings, equipment, staff and research students, alongside reconsidered research and impact structures, will encourage and support effective engagement with research users at all stages of the research life cycle.

d. Relationship to case studies

The two case studies presented reflect long-established and continuing strengths of environmental science within the University. The sedge studies incorporate taxonomy and biodiversity, a field of internationally recognised importance that is in decline in terms of practitioners both within UK HE and globally despite being of international concern for a number of reasons including economic and ecological (e.g. House of Lords Select Committee Fifth Report, 2008). It developed from discussion with stakeholders alongside an interest in taxonomy, speciation and hybridisation from the main author (Ashton). Regular dissemination via non-academic routes led to its wider impact as sensitive management was introduced to the population under study to ensure its conservation.

The second study, that of Worsley, utilised sediment coastal dynamics, to develop a collaboration between EHU and Sefton MBC which served as a vehicle to disseminate scientific information to the wider public. It also resulted in the development of very close relationships between academics and practitioners in Sefton MBC, and across the wider coastal scientific community throughout the European Union with scientific, social and policy benefits.

Work in these broad areas - climate change, biodiversity and taxonomy - continues within the department, strengthened by new staff and equipment. As such the case studies are typical of previous and future works of the group. Moreover the whole idea of formal partnership as exemplified by this second study, with stated common aims which were successfully followed through, serves as a template for future environmental work at EHU. This has influenced the strategy we have presented above.