

Institution: THE UNIVERSITY OF LEEDS
Unit of Assessment: C-17 Geography, Archaeology and Environmental Studies
a. Context

The School of Geography (SoG) has a deeply embedded commitment to the production of research that makes a difference beyond the academy. This commitment substantially pre-dates recent formulations of the impact agenda, and it is central to the missions of all five of our research clusters. We have an established international reputation for applied spatial analysis that extends back to the early 1970s. We also have recognised experience and success in promoting knowledge exchange between scientists and policy makers. Over the past decade we have developed a considerable nexus of expertise in participatory approaches to knowledge production which helps ensure the relevance of our research to user groups and communities. All five of our research clusters have generated significant impacts during the assessment period. The *Centre for Spatial Analysis and Policy (CSAP)* is known for sophisticated applied research often designed with end users in mind. *River Basins Processes and Management (RBPM)* has an extensive track record of cultivating research linkages with industry and government on environmental management practices. Research by *Ecology and Global Change (EGC)* on the global climate-vegetation system has proven significant to governments, NGOs, and inter-governmental organisations, with members providing expert advice in this area. *Citizenship and Belonging (CAB)* and *Cities and Social Justice (CSJ)* both produce critical social science—often within a participatory paradigm—that has benefited civil society groups, social movements, and NGOs.

The impacts of our research are far-reaching, involve diverse beneficiaries, and span domains including the following (we use examples drawn from both within and beyond our Case Studies to illustrate our collective engagement with impact):

Economy and industry: These are exemplified by the financial benefits of water colouration research for the *water industry* (Case 1); the impacts of retail network modelling research on *global corporations* including Volkswagen Group, Adidas, and ExxonMobile (Case 3); and the influence of sustainable urban drainage research on *construction industry* guidance (Case 6).

Environment: RBPM research has promoted sustainable practices for uplands/peatlands (Case 5) and water industry moorland land management practices (Case 1). Research by Carver and collaborators has influenced both the *US National Park Service's* land management strategies (e.g. fire/fuel treatments) and development control for wind farm sites in/near Scottish wildlands.

Policy, guidance, and statistics: CSAP have improved national statistics by influencing the *Office of National Statistics's* methodology for estimating subnational migration (Case 2), and Rees provided testimony to the House of Lords Select Committee on Public Service and Demography. EGC research has transformed practices/understandings in governments and NGOs regarding forest monitoring (Case 4) and is integral to *Gabon's climate strategy* (Case 4). The Pan-European Soil Erosion Risk Assessment project (modelling led by Kirkby) has influenced *proposals for an EU Soil Directive*. Research by Carver has benefited *Scottish Natural Heritage* and the development of *Scottish wildlands policy*, while sustainable uplands research has influenced *DEFRA* (Case 5). D. Phillips' research continues to influence the *EU Fundamental Rights Agency*.

Culture and society: Vanderbeck and collaborators' research on debates over human sexuality in the *worldwide Anglican Communion* (80 million members) has influenced the design of its Continuing Indaba project, promoting dialogue between churches in the global North and South (see Section b.ii). Chatterton's action research on building *sustainable communities* has influenced local government policy (Section b.v). CSJ's gentrification research has benefited *citizen campaigns* which seek to protect traditional retail markets in towns and cities (Section b.iii).

Informed public debate/public understanding of science: Our research has been widely reported in international/national media. We have a particular nexus of contributions improving public understanding of the Amazon, water resources, sustainability, urban regeneration and consumption cultures (e.g. the New York Times, the Guardian, the Telegraph, the Independent, BBC radio and television, New Internationalist, National Public Radio USA).

b. Approach to impact
i. OUR APPROACH TO GENERATING AND SUPPORTING IMPACT

Following RAE2008, we produced a strategic plan that made the maximisation of impact central to our mission of providing international leadership on major social, political and environmental challenges. We employ diverse models for facilitating impact. Since RAE2008, we have further

broadened staff awareness of knowledge exchange (KE) and impact opportunities, facilitated access to training/mentoring to enable effective pursuit of these opportunities, invested resources where there is scope to develop impact, and adopted policies on workload, promotion, and career development that recognise KE. Core planks of our approach are described below.

ii. STAFFING PRACTICES AND INVESTMENT IN OUR 'IMPACT INFRASTRUCTURE'

Since RAE2008, SoG and the Faculty of Environment have created new roles and made new appointments to promote a world-class, sustainable impact infrastructure. SoG appointed Birkin as *Director of External Relations*, with strategic oversight for building our relationships with external partners. Birkin has deep experience of building links with industry and other research users. We have invested in a full-time *Research Development Manager* whose remit includes providing support to impact activities and to bids for KE funding. The Faculty have appointed a *Director for Innovation and Enterprise* who works closely with SoG. Through our staff review and mentoring schemes, staff (particularly early career researchers) are encouraged to participate in Leeds Innovation and Enterprise training (<http://www.sddu.leeds.ac.uk/sddu-impact.html>). *Reforms to our workload model* (2009) explicitly recognise time devoted to KE activities, allowing staff to request additional workload credit for KE. The University/Faculty have revised promotion criteria to give greater weight to impact, with 'Enterprise and Knowledge Transfer' a distinct category of activity contributing to Grade 9 or 10 promotions. We have also adopted *agile staffing practices* to allow pursuit of impacts. For example, on completion of Vanderbeck's (Co-I) and collaborators' AHRC/ESRC funded project (2010), RA Sadgrove was re-employed by SoG on another grant but given flexible leave to pursue impact with the Anglican Communion on its Continuing Indaba (CI) project (see Section A), allowing for intensive KE. She was invited to work with CI after a dissemination event. The research has substantially influenced CI's approach and is described by the Anglican Communion Office as 'very significant to the organisation' (letter on file).

iii. EXPERTISE IN PARTICIPATORY APPROACHES TO RESEARCH IN ALL CLUSTERS

An area of expertise that cuts across our five clusters involves participatory approaches to research and knowledge co-production, which generate excellent research directly relevant to users. For example, Carver and collaborators have used a participatory approach with the Confederated Salish/Kootenai Tribes in the US to develop online tools to better capture wilderness meanings/values for tribal and non-tribal residents in Montana, with results influencing decisions about wildfire fuel treatment for tribal forests. Citizen participation and involvement has been a central feature of the Uplands Sustainability programme (Case 5). CSJ staff González and Waley have worked closely with market traders and anti-gentrification groups to develop interpretations of policy documents regarding the planned 'upscaling' of traditional markets, co-producing knowledge directly usable by citizen campaigners (*Antipode* 2013). Chatterton's participatory action research has fostered the creation of innovative ecological co-housing in Leeds (see Section b.v). Routledge's appointment as Chair has further consolidated expertise in this area.

iv. INVOLVEMENT IN UNIVERSITY INITIATIVES AND STRATEGIC PARTNERSHIPS

We have been both leaders and key participants in University initiatives designed to scale-up impact activity. Holden leads *water@leeds*, a 2008 initiative (funded with £1M from the University's Transformation Fund) to form the UK's largest university-based water research centre, involving many RBPM staff. *Water@leeds* employs Martin Tillotson (SoG joint appointment) as *Director of Industrial Research*, using his extensive industrial experience to extend links with the water industry. A strategic partnership with Yorkshire Water provides a model for sustained collaboration on which we seek to build (see Section c.ii). Yorkshire Water received information and advice on the latest science base from SoG and then commissioned SoG researchers to take this forward, leading to both excellent research and financial/environmental impacts (Case 1).

v. USE OF COMPETITIVE KNOWLEDGE EXCHANGE FUNDING, AWARDS, AND STUDENTSHIPS

We have successfully pursued external funding for KE. For example, Norman (PI) and Rees used *ESRC follow-on funding* ('Ethnic group population trends and projections', £88K, 2010-11) to develop a web interface making data accessible to government, NGOs, and others, plus hosting a summer school to 'skill up' users. Holden (PI) used *ESRC follow-on funding* to maximise impacts of Sustainable Uplands research (Case 5). We employ a *NERC Knowledge Exchange Fellow* to build

relationships with industry and policy leads to aid delivery of the EU Water Framework Directive. Chatterton won a *2010 Higher Education Social Entrepreneurship Development Award* to support work on affordable, ecological co-housing, shaping Leeds Council policy and chosen as an exemplar by the Commission on Architecture and the Built Environment. We have used the CASE Studentship model to extend/build enduring external relationships (16 total: 7 NERC, 8 ESRC, 1 EPSRC). Partners have included Wildlife Conservation Society-Congo, Scottish Government, CACI Ltd., UN Environment Programme World Conservation Research, Sainsbury's, and Asda.

vi. OUR SUPPORT OF IMPACT BY THE WIDER SCIENTIFIC COMMUNITY

SoG have invested in activities to support impact by the wider scientific community. We founded (2008) and support *Applied Spatial Analysis and Policy* (Springer), which draws on spatial analysis for the assembly/interpretation of evidence that can be applied in policy, business, and beyond. We supported public understanding of environmentally-friendly urban gardening with a *Gold Medal Winning Exhibit in the Chelsea Flower Show* (RHS Environment Category 2012). Mitchell and RA Slack collaborated with Biological Sciences/Environment colleagues (with NERC and Faculty support) to demonstrate lessons for urban gardeners from ecosystems services and sustainable urban drainage research, receiving national and international attention [e.g. <http://www.bbc.co.uk/news/uk-england-leeds-18072367>; *Horticulture Week* 23/05/2012].

c. Strategy and plans

i. OVERVIEW OF OUR POST-REF IMPACT GOALS AND STRATEGY

SoG seeks to be a world leader in producing impact from excellent geographical research. Building on our extensive impact infrastructure, our post-REF strategy involves extending the reach and significance of our research impacts. Progress will be regularly reviewed in Research Committee. Although we continue to appreciate that outstanding impacts can emerge from research with less defined impact pathways, the potential for research impact is a key driver of our hiring strategy. With many lessons learned about the complexities of tracking impact, our Research Committee is studying leading research and guidance—such as the *DESCRIBE Project 2013* (Definitions, Evidence, and Structures to Capture Research Impact and Benefits)—to ensure an efficient, co-ordinated approach to enabling and evaluating impact. We are working with the Leeds Press Office to refresh our communications strategy, including more systematic use of social media and the deepening of contacts with media outlets/opinion makers.

ii. BUILDING STRATEGIC PARTNERSHIPS

We view Strategic Partnerships as critical elements of sustainable, fresh, and relevant research programmes with major impact. In addition to our existing partnership with Yorkshire Water, we are currently involved in a new Leeds Strategic Partnership with Arup, a multinational design/engineering consultancy. The partnership will bring together engineering and social science expertise to foster new thinking in sustainable business practices through research into green behaviours at work, innovative transport systems, energy reduction and efficient use of resources. SoG and water@leeds have a dedicated funding stream related to environmental monitoring, and have included Arup in recent doctoral training bids. We are drawing on our substantial in-house expertise to identify and facilitate new strategic partnerships. One example of this is CSAP's partnership with [text removed for publication], supported by funds from HEIF and EPSRC impact accelerator funds.

iii. INVOLVEMENT IN THE UNIVERSITY OF LEEDS SECTOR INNOVATION HUBS

The University has recognised that addressing significant global challenges requires co-ordinated, interdisciplinary thinking. Using HEIF funds, Leeds has implemented a *sector-based Innovation Hub approach* to working with business, industry and policy makers. The Hubs are focused centres which form gateways to Leeds' expertise across 14 identified areas of strength. SoG leads the Water Hub (<http://www.leeds.ac.uk/info/125085/water>), and we are developing closer linkages with Climate and Geohazards, Transport Systems, and Cultural and Creative Industries.

iv. PROVIDING SUPPORT AND RESOURCES TO DEVELOP PRIORITY AREAS OF IMPACT

There are a number of developing research areas with significant impact potential that we will strategically nurture. Although these cannot all be anticipated, priority areas include the following:

- 1) *Refugee and asylum seeker support*. We anticipate important impacts from two intensive,

funded programmes of KE. Waite (PI) and Hodkinson have been awarded ESRC follow-on funding (£77k, 2013-14) to develop a KE platform on tackling forced labour amongst asylum seekers, to involve the Refugee Council, and others. Conlon (Co-I, with Exeter) has ESRC support (2013-14) for 'Linking the Demand and Supply of Research Expertise for Migrant Support in the UK and US', with close participation of migrant support groups.

2) *Global forest monitoring*: EGC are building new networks in East/Southeast Asia to parallel successes/impacts related to global forest monitoring in Latin America and Africa (Case 4).

3) *Pharmaceutical contaminants in water*: RBPM staff researching emerging contaminants in the water environment are working closely with the Environment Agency, who will feed research into policy development and management for the Water Framework Directive.

4) *Low carbon cities*: CSJ staff are participating in cross-University efforts to develop impact on the theme of low carbon/climate-friendly cities, building on a track record of innovative research.

5) *Census support*: Software developed by the Centre for Interaction Data Estimation and Research (ESRC Census Programme, Stillwell PI) is now part of the UK Data Service Census Support service and is likely to be used by ONS to disseminate flow data from the 2011 Census.

6) *Greenhouse gas monitoring*: EGC research is informing the design of long-term strategic monitoring of greenhouse gases in Brazil, discussed at a joint Brazil-UK Royal Society meeting.

7) *Hydrological/geomorphological drivers of malaria transmission in Africa*: Smith and collaborators are developing a predictive tool for mapping malaria transmission hazard to support the planning of environmental interventions, in collaboration with Ifakara Health Institute-Tanzania.

V. GROWTH OF EXTERNAL FUNDING FOR KNOWLEDGE EXCHANGE AND ENTERPRISE ACTIVITIES

We aim to increase the income we generate in this area to enable the full realisation of impacts from our research. Building on past success, Research Committee will support these applications, and early career researchers given mentoring from successful applicants. We are also seeking to ensure that all Pathways to Impact are costed in ways that allow for full realisation of impacts.

d. Relationship to case studies

i. SCHOOL, FACULTY AND UNIVERSITY SUPPORT FOR CASE STUDY IMPACTS

Our six case studies represent particularly mature manifestations of our long-standing support of impact and KE. There are a number of specific ways in which the development of our case studies has been influenced by School, Faculty, and University strategy and support. **Case 1** (impacts on water industry of peatland catchment research) benefited from sustained resources for building relationships with the water sector, receiving strategic support from HEIF funds. **Case 3** (retail networks) was the beneficiary of long-standing University support for spin-out companies, which has subsequently contributed to a nexus of commercial expertise in SoG. Similarly, **Case 6** (impacts of research on sustainable urban drainage) received excellent support from the Research and Innovation Office in understanding and negotiating the licensing of research data. All of our case studies benefited from a School/University context that provides time, support, and resources to pursue potential impacts that emerge from both anticipated and unplanned routes.

ii. CASE STUDY INFLUENCES ON OUR POST-REF STRATEGY

The case studies have been studied closely by Research Committee to better understand the diverse channels through which impact occurs, as well as pitfalls and challenges. We have learned many lessons from our case studies that have shaped our post-REF strategy (see Section C). Lessons have been disseminated and discussed via routes including the 2013 SoG Away Day. Although lessons from our case studies cannot all be named here, specific examples include:

The nature of partnership: **Case 1** impacts on water industry of peatland catchment research and **Case 2** (impacts on National Statistics) have both exemplified the complexities and time involved in building close relationships with research users and to understand their working practices and needs. We have used these as models within SoG, particularly with Early Career Researchers.

Tracking impact: **Case 4** (impacts of tropical forest biomass/dynamics research) involved close work with governmental/non-governmental agencies to develop improved data measurement practices for monitoring forests. We have learned much about working with and tracing impact involving non-UK agencies and organisations, such as issues relating to language, cultural difference, and power.

Citizen participation: **Case 5** (impacts of Sustainable Uplands research) has proven an important addition to our substantial expertise on citizen participation and user engagement.