Institution: Durham University

Unit of Assessment: 17

a. Context

Durham Geography regards impact as an integral facet of knowledge creation. Since the 1980s our research has had impact in a wide range of non-academic spheres through (1) a strong commitment to shaping evidence-based policy (economic, urban, health, environment) at local, regional, national and global scales; (2) pioneering and advancing critical, activist, and participatory traditions of working; and (3) developing state-of-the-art methods of monitoring and modelling aspects of the physical environment that are of direct relevance to societies.

We return seven impact case studies (ICSs), four from physical geography and three from human geography. A further ICS on health policy is returned to UoA 22. Most ICSs are based on work by several members of staff, reflecting a team approach to impact generation and demonstrating the benefit of collaboration in a large unit. We have a diverse constituency of non-academic users, not all of whom are represented in our returned cases. Our main users and beneficiaries include government and regulatory bodies (regional, national and transnational); regional museums and galleries; community groups; third-sector organisations working at all scales, including charities and NGOs; SMEs and multinational businesses; science policy professionals; and the natural environment.

b. Approach to impact

Our approach to impact is multifaceted, reflecting our size and the diversity of our research and user constituency. Staff develop key relationships with users to realise impact in two main ways: via a range of co-production models of working, and through knowledge exchange partnerships.

Our first approach to generating impact is through various modes of co-production whereby we produce impact through working in partnership with end users. Examples include work with UN Habitat on cities and climate change (**Bulkeley**); a partnership with DNO Northern Power Grid and British Gas, funded by the energy regulator Ofgem (**Bulkeley**); work with infrastructure company Carillion in relation to smart infrastructure and low carbon transitions (**Bulkeley**, **Marvin**); an ESRC/NERC-funded project involving the Environment Agency and SEPA which identified principles for adaptive co-management strategies for resilience to flooding on the English/Scottish border (**Bracken**); and networks that bring researchers and users together (e.g. **Power**'s leadership of the Low Carbon Energy For Development Network, facilitated through the Department of Energy & Climate Change and the Department for International Development).

Another means to co-production of impact is through various styles of participatory research. **Pain**, **Bracken**, **Tolia-Kelly** and **Dunn** have worked in this way with third-sector organisations, community groups, and museums and galleries. Much of **Pain**'s work is conducted with Durham University's (DU) Centre for Social Justice and Community Action, which aims to develop community-university relationships, infrastructures and capacity building to enable participatory action research. Geography-based projects in the period have involved 24 partners including African Community Advice North East, Scottish Women's Aid, and the Tyne & Wear Archives and Museums Service (ICS 7).

Our second main pathway to impact is via knowledge exchange (KE), which generates impact through long-term partnership collaborations. Collaborative (e.g. RCUK CASE) PhD studentships are an excellent way to do this, and we secured 20 over the assessment period. Some of our CASE partners figure in our returned ICSs; others include Age Concern UK, Building and Social Housing Fund (BSHF), Durham County Council, Friends of the Earth, GoAhead Northern, One North East, North East Public Health Observatory, Traidcraft, and Wessex Archaeology. The KE model also underpins MSc and PhD projects funded by River Trusts, Wildlife Trusts, and National Park Authorities (**Bracken**, **Carbonneau**, **Reaney**, **Warburton**). Other KE work include two ESRC-funded projects, one in South Africa which aims to train flower-pickers as para-ecologists (**McEwan**) and a second which built links between policy makers and the private sector in relation to ship recycling (**Gregson**/ **Crang**), and Defra-funded research on reuse exchange to inform policy formation on waste prevention behaviours (**Gregson**).

We also seek to achieve impact by involving potential beneficiaries as collaborators in our RCUK-funded activity. Examples include EPSRC-funded research on the vulnerability of older people to climate change (**Curtis**, **Reaney**, **Dunn**) which has helped shape guidelines for NHS sustainable development policy and practice; ESRC-funded work on the use of commercial data for security purposes which has influenced the development of European policy on data mining and data sharing with third countries (**Amoore**); NERC/ESRC-funded research on earthquake resilience and mitigation which involves government and NGO partners in nine Asian countries (**Densmore**, **Petley**, **Rigg**); and NERC-funded research with the Environment Agency, National Trust, and Natural England on upland sediment delivery (**Warburton**).

Sometimes the different approaches to achieving impact overlap or develop from one into another. Our long-term relationship with Cleveland Potash Ltd (ICS1) is a good example. It began with a relatively small research project involving **Petley** and **Rosser** where impact was via knowledge transfer. The success of that work led to a knowledge exchange partnership, with funding for two PhDs and 4 PDRAs, and then to the Boulby Geoscience project, funded by One North East, which supported 3 PDRAs, a technician and a secretary in the period.

Dissemination is a key pathway to impact and we encourage a variety of forms to maximise potential impact. Work for governments and international bodies, where there is a close relationship between research, expertise and advisory roles, feeds into influential policy reports such as **Bulkeley**'s on cities and climate change for the World Bank and **Marvin**'s lead authorship of the 2013 UNEP International Resources Panel report *City-Level Decoupling: urban resource flows and the governance of infrastructure transitions*. **Atkinson**'s membership of a Thematic Reference Group contributed to the World Health Organisation's *Global Report for Research on Infectious Diseases of Poverty*. We encourage and fund staff and postgraduates to organise dissemination events and practitioner-focused workshops (e.g. **Anderson**'s workshop on exercises in emergency planning involving Newcastle City Council). Such events help enhance our understanding of how our work has impact within particular organisations, allowing us to understand our users better.

More broadly we publicise our work to diverse potential users by writing reports, technical advice notes and briefing papers, as well as topic/issue-focused blogs, and by partnering with film makers (e.g. **Staeheli**, **Hudson**, **Painter**) and artists (e.g. **Amoore**, **Atkinson**, **Tolia-Kelly**). Influential briefing papers produced by our PhD students include one by Armstrong (CASE PhD, 2009) on regeneration in Newcastle-Gateshead which was used in written evidence to a House of Commons Select Committee; one by Stevens (CASE PhD 2010) which was used by Gateshead and Oxford councils to inform school travel policies; one by Silver (PhD 2013) which informed the housing low carbon retrofit agenda in Cape Town; and one by Ziegler (CASE PhD, 2010) which was used by Age Concern to inform policy on elder mobility. Our strongest example of generating technical advice notes is **Cox**'s 48 publications since 2008 in the ISI-listed *Stata Journal*, a major resource for non-academic data analysts. Cox is the second-leading software author (with 8,400 downloads out of 112,000) in the Statistical Software Components segment of the largest global bibliographic database for practising economists (ideas.repec.org/s/boc/bocode.html, hosted by the US Federal Reserve Bank). Influential blogs include www.raidingresearch.co.uk (Cockshut, PhD 2012) on gaming, which received 1500 hits on 09.11.2010, and **Petley**'s landslide blog, now hosted by the American Geophysical Union (blogs.agu.org/landslideblog), which has received ~1.3M individual views since November 2010.

Time is critical to the achievement of impact. Staff have been supported to develop impact through dedicated fellowships and a workload model which has headroom to enable staff to leave Durham at short notice with cover provided by colleagues. Each of our RCUK fellows in the period (**Rosser**, **Reaney, Kearnes**) features in an ICS. A Beacon Fellowship awarded to **Tolia-Kelly** was critical to the development of an exhibition and allied educational materials which highlighted the multicultural history of Hadrian's Wall. Institutional support occurs primarily though our institute-facing activity, notably via the Institute of Hazard, Risk and Resilience which has provided in-kind and financial resource in support of impact described in ICSs 1, 2 & 3. The Institute of Advanced Studies hosted the film-maker Sudheer Gupta, producing a film (with **Hudson**) on river pollution, whilst **Painter's** work with the Durham book festival commissioned a new film from Michael Smith on 'Localism'. Further financial support is available from the University's Impact Seed Corn Fund, which assisted work described in ICSs 6 & 7. Since 2011 the Department's resources have been

realigned to recognise the importance of impact. We now have a dedicated in-house Impact Officer to support staff in evidencing the impact of their research, and a fund, open to all department researchers, which supports activity with clear potential for impact and provides seed corn for unfunded 'pathway to impact' activity. Examples of current projects include work with a film maker on photovoltaics in Bangladesh involving **Gregson**, **Power** and a PhD student and a study of control rooms as part of wider work on emergency governance (**Anderson**).

c. Strategy and plans

Our Research Strategy (see REF 5) promotes impact excellence and recognises that impact is a core activity, via individual and collective projects or through activity aligned with our research units (e.g. ICS 5) or DU Institutes and Centres (e.g. ICS 7). Support for and recognition of impact is now fully embedded in our staff development activities, particularly the annual staff review process, and in the evaluation of research leave applications and academic appointments and promotions.

We will deliver our impact strategy by the following five plans.

(1) *Widen and deepen the reach of impact across generations of researchers*: The importance of impact is changing the ways we work. Previously, excellent impact often just happened as a routine part of research, but we are now much more strategic in identifying potential impact and then supporting it. We have a rolling portfolio of research with impact potential, including projects at various stages of development. Those in their infancy receive support and direction from staff experienced in impact; with more established ones we explore ways to add value to existing impact. A detailed review of impact activity across the department, including ICSs returned here, shared best practice across the Department and showed the potential of widening and deepening impact across much of our research activity. Our impact portfolio currently comprises some 15 new and existing projects across human and physical geography.

Future plans include drawing more strongly on the work of the research institutes with which we ally, integrating impact more centrally within our research culture via the work of our clusters, and establishing cross-department impact-facing workshops oriented to working with particular types of users. We aim to increase the number of collaborative research studentships held in the Department, and will embed the importance of impact within our PGR community through collective discussions of examples mentioned in Section b. We will encourage research clusters to develop additional long-term relationships with users and beneficiaries and establish cluster 'banks' of users; this will help ECRs begin to grow impact networks. Research Committee will promote (and review) an annual programme of cluster-based impact activities involving short-term placements for users and potential beneficiaries within the department, akin to our academic visitor programme, and user seminars and workshops timed around the dissemination stages of research projects. We will continue to use our seed-corn funds to support fledgling impact activity (see Section b).

(2) *Continue to invest in people as a means to enable potential future impact*: As well as our existing academic staff, we recognise that alumni (particularly PGRs) can be key intermediaries to achieving impact as they advance their careers within diverse organisations (e.g. ICS 1 & 4). Recognising the potential of alumni to become future users and beneficiaries once they leave Durham, as part of our dissemination strategy we will promote our research and particularly its impact more strongly to current students (in Level 4 and via PGT and PGR training), and within alumni publications and events.

(3) *Strengthen our understanding of the connections between dissemination and engagement and impact*: As well as continuing to publicise our work to a wide range of potential users, we are starting to use web analytics to capture the reach of our reports, briefing papers and technical notes, and blogs. An immediate goal is to develop and enhance our use of these tools. Understanding reach is critical to researching impact, and this is a key activity for our Impact Officer in future.

(4) *Exploit our technical skills in physical geography by promoting them to broader audiences*: Our physical geography clusters have produced many innovations in environmental monitoring (particularly by short-range remote sensing) and environmental modelling. Some of these have been developed in association with non-academic users and have already had impact (ICSs 1, 3 &

4) but there are other innovations, made initially for academic reasons, which have the potential for non-academic impact. Our work on catchments and forestry has shown the importance of publicly-accessible and easy-to-use web-based or downloadable models and toolkits (ICSs 3 & 4). A future priority is to consider which other innovations could be made accessible in these ways.

We have also begun to explore the knowledge transfer partnership (KTP) model of impact, winning KTP funding for collaboration with industry partners. Examples in the period include a NERC-funded partnership with 3D Laser Mapping (**Rosser**), NERC/Technology Strategy Board funding with Network Mapping (**Donoghue**), and NERC funding with APEM Ltd (**Carbonneau**). Our KTPs typically exploit a particular research advance – e.g. laser scanning for rock slope monitoring (**Rosser**) or automatic river grain-size measurement (**Carbonneau**) – that can be developed to give the non-academic partner a competitive advantage. We will consider possibilities for further KTPs in physical geography on a case-by-case basis.

(5) *Improve and enhance methods of researching, documenting and evidencing impact*: Support for researching, evidencing and documenting impact comes via an in-house Impact Officer who supports colleagues and horizon-scans policy timelines, promoting the communication of our research to wider user constituencies. The Impact Officer has supported the evidencing and writing of all our returned cases. He will continue in this role, liaising with institution-wide Professional Support Service staff with a specialist background in media and communications. The development of robust mechanisms for the collection of impact evidence is a priority and will include supporting monitoring before, during and after all impact-related activity, not just REF-related impact. We see improved evidence gathering not simply in audit terms but as critical to achieving an enhanced understanding of the range of our users and beneficiaries.

d. Relationship to case studies

The relationship between our ICSs and the Department's support for impact is reciprocal, and has evolved in line with the requirements of individual cases. Our strategy is informed by the lessons learnt in the development of the cases reported on. This has been an iterative process, shaped also by the development of our understanding of impact, impactful activity, and pathways to impact. Our ICSs have guided the formation of our approach, strategy and future plans as follows:

(1) Our returned ICSs illustrate our two primary approaches to impact. ICSs 3 (*River flooding and diffuse pollution*) and 7 (*Embedding participatory research in museum practice*) exemplify the co-production model. In ICS 3 this was achieved through the conduct of the research, and in ICS 7 via the involvement of key stakeholders in the inception, design and conduct of the research. The knowledge exchange model is illustrated by ICSs 1 (*Management of landslides and rockfalls*), 2 (*Sea level change and coastal planning*), 4 (*Remote sensing tools for rapid and cost-effective forest management*), 5 (*Boundary making and resolving disputed territorial claims*), and 6 (*Governing science and technology responsibly*), all of which involved dissemination and engagement activities with key stakeholders and partners.

(2) Our promotion of dissemination and engagement activities as pathways to impact is informed by experience. ICSs 3, 4, and 5 used dedicated practitioner-focused workshops to showcase research capacities and engage potential users in practitioner-facing problem activities. ICSs 3 and 6 involved extensive discussion with users to realise the nature and evidence of impact. This led to recognising the importance of understanding how our knowledge has affected the thinking and practice of specific organisations.

(3) The importance of key intermediaries and people applies across our ICSs. The value of former PhDs or PGRAs in particular to the development of impact is demonstrated by three of our physical geography case studies. In ICSs 1 and 4, they have gone on to apply techniques first developed at DU in the commercial world; in ICS 2 they have gone on to work in key consultancies which have subsequently become key intermediaries in connecting our research with users and beneficiaries.

(4) Recognition of the importance of particular analytical techniques and web-hosted devices as key pathways to impact in physical geography comes from ICSs 1-4; the importance of maps and databases is exemplified by ICSs 2 and 5.