Institution: University of St Andrews

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

a. Context

Geography and Geoscience is a discipline with a long tradition of research linked to societal impact, ranging from the sustainability and environmental consequences of extracting natural resources through to social interactions and health of our communities. The school's research therefore has a broad group of non-academic beneficiaries and audiences. Core audiences include the: 1) public (including young people – where we have communicated key issues around the environment and environmental change), 2) private sector (especially the mining industry), 3) practitioners and professions (in particular those addressing issues around housing and the future of cities) and 4) civil servants and policy officials (those needing to know about population change and spatial variance of need).

- We have been active in enabling **the public** to engage with the core findings of our research into ***environment and environmental change*** through interpretive works (eg exhibitions, museums), outreach to schools and public engagement. Examples of ***interpretive works*** include exhibitions at *350th Royal Society Summer Science Exhibition* (London, 2010), the *Best of Scottish Science at Dynamic Earth* (Edinburgh, 2012), *Royal Society Summer Science Exhibition* (London, 2012) and permanent museum exhibits in Orkney (Tomb of the Eagles). ***Outreach to schools*** has been through our mobile GeoBus project which takes research into the heart of primary and secondary education. Examples of ***public engagement*** include work with *SNIFFER* (Scotland and Northern Ireland Forum for Flooding).
- Our impact on the **private sector** stems in particular from our research into ***mineral and hydrocarbon resource exploration and wet-renewable exploitation***. This includes providing overarching exploration models for Pb-Zn and the rare earths with industry (Minerals and Metals Group & Nuna Minerals) and government (US Geological Survey); Timing of Mg-silicate distribution and its controls on porosity and permeability distribution in offshore basins with Petrobras and BG Group; Launching of three Spin-out/start-up companies (ADUS Deep Ocean Geo Surv and SOI Ltd) for work on marine habitat management and wet-renewables development.
- **Practitioners and professionals** are engaged with our research into **housing and the future of cities** aiding them in ***planning and delivering services*** such as urban regeneration policy (e.g., *Glasgow and West of Scotland Forum on Housing* (GWSF) in relation to Scottish Government's Regeneration Strategy). The CORE and SCORE projects from the Centre for Housing Research provide key statistics for the entire social housing sector in the UK, allowing them to plan effectively. Research for the *Scottish Government* and seven key urban *Unitary Authorities* (e.g., our *Scottish Cities Knowledge Centre*) is helping practitioners deliver economic development, transport and other urban services.
- **Civil servants and policy officials** – have used our research into the **demography of Scotland and the UK, UK social index work** and **mineral content of tobacco** for ***planning, policy development and resource allocation***. For example, UK policy on international students (via Membership (2011-12)) for the *Dept. for Business Innovation and Skills' UK Expert Working Party,* and its recommendations on future UK policy). UK central and local government have used our small area measures of need for resource allocation and other policy decisions. The EU is using information on the origin of tobacco to monitor the industry across Europe (see case study 1).

b. Approach to impact:

We use six main approaches to engage effectively with non-academic users of our research and therefore maximise its impact:

1. ***Effective mass communication using electronic and social media***. Links have traditionally been initiated by media organisations because of the quality and timeliness of our research. However the role of knowledge exchange officers (see below) is now key in the 'visibility' of our research. Over a number of years there have been more personal contacts and greater exposure within the media for our expertise in different subject areas. We have been

increasingly pro-active in suggesting topics of public interest that should be covered. Highlights include staff engagement via participation in significant public programme broadcasts: eg Life on Earth, Frozen Planet, National Geographic, Coast and Time Team. **Bates,** for example, played a significant role in the BBC's *Operation Iceberg* (29 October 2012) that enjoyed an audience of over 3.5m. **Clayton's** 2012 piece, critically commemorating the 50th anniversary of the arrival of US combat troops in Vietnam, placed on the internationally-leading web-blog forum *Open Democracy* (11th December 2011) is an exemplar of impacting public policy through user engagement.

2. ***Through Knowledge Exchange (KE) practices***. In addition to individual engagement, our research groupings approach impact in a strategic fashion, having staff whose role (wholly or in part) involves user engagement and research impact - *Centre for Population Change* (two staff members), and *the Administrative Liaison Service*, the *Centre for Housing Research (CHR)* and the *Longitudinal Study Centre Scotland* each with one staff member. Our KE approach is multifaceted, and guided by the concept of Knowledge Mobilisation, which aims to make research "ready for service or action." We support collaboration between academics, policy makers and practitioners, and the subsequent co-production of research. A single example from CHR must suffice to evidence the impact of this work - The Scottish Government website states "SCORE data forms an invaluable source of information on a range of issues related to new lets in the Scottish social housing sector. …it can be used in assessments of housing issues such as effectiveness of equal opportunities policies, levels of rent and housing benefit-eligible service charges and efficient management". Staff regularly attend non-academic events where their research can be discussed - and inform debate. We use a range of tools (twitter, email, etc.) to communicate with a broad range of sectors, disciplines and places. The school is actively trying different methods of engaging others in its work (eg. podcasts, on line learning, Telefora). We believe that a dynamic culture supports new ways of opening dialogue and enhances the schools' research impact.

3. ***Through participatory research***. A key feature of our approach to impact is to engage with stakeholders throughout the research process. This involves ensuring that the 'subjects' of research are engaged in the research process from inception through analysis and conclusion, and then in the decisions that emerge from the research findings. This grounds research in social realities, and increases the chances that impacts will be fair and effective. Most staff have a long-established approach to impact as a process engaging the 'researched' (e.g. via participatory research methods) and the policymaker from the start of the research process (e.g., Our Resilient Future's work on how to make the UK's energy and transport infrastructure resilient to threats has engaged stakeholders such as the *Red Cross*, *British Transport Police*, *BT*, *Transport for London*). Our approach is premised on the belief that engagement of stakeholders from the outset is the most effective means to achieving behavioural change in, for example, sexual behaviour in Southern Africa (**Kesby**), practitioner agency outcomes (**McKee**) and policy impacts (**Graham; Houston**).

4. ***Through engagement with those involved in policy formation***. *W*e have moved to a more targeted approach to policy engagement. This involves either locating researchers in policy making environments or bringing policy makers into the academy. This means that we are far more responsive to the research needs of the policy community but are also able to more effectively target our KE activities. For example, the *Centre for Population Change (CPC)* with the support of the National Records Office established a permanent post located *within* Scottish Government to a) facilitate knowledge exchange from our demographic research projects directed at practitioners and civil servants, b) organise practitioner/policy makers seminars (**McCollum; Feng**), and c) promoting dialogue over policy implications (**Findlay; Graham**) arising from research (20 events held at Ladywell House and National Records Office, 2010-12). The *Centre for Housing Research* has organised government ministers to attend a series of research events hosted at the University of St Andrews including visits by the Housing Minister (18th Jan 2011) and meetings with the Deputy First Minister (1 October 2012). International research findings have been presented at UNICEF headquarters in New York (**Graham**). Targeted policy impact works hand in hand with our approach to mainstreaming impact in nearly all the funded research of our unit.

5. ***Through outreach and training.*** The unit has a long history of outreach to primary- and secondary-aged pupils, including 5-10 visits to schools each year by academic staff. Our desire to find an appropriate outreach mechanism for core science research in the NERC funded Programme "Long-term Co-evolution of Life and the Planet" led to the establishment of the successful ***GeoBus*** programme. This ground-breaking initiative provides support for teachers covering the Earth Science curriculum and brings a number of novel workshops to schools. Since January 2012, ***GeoBus*** has involved over 15,000 school pupils in 120 different schools. Other outreach and engagement activities include the Open Day for National Science and Engineering Week in March, two Royal Society of Edinburgh Science Masterclasses for 12-14 year old pupils each year, and teaching on the Sutton Trust Summer School, International Summer Science School, and Science Foundation School every year to encourage access-region pupils and overseas students to experience university-level study. We also run a series of short training programmes in the areas of our specialisms (eg. the use of linked administrative data). See also case study 5.

6. ***Through connecting with Industry****.* We aim to establish high value interactions with the minerals, hydrocarbon and environmental sectors through targeted approaches to key individuals. Our engagement with mining companies extends back to the 1970s with a continuous flow of funding for PhD studentships over the assessment period, (Nuna Minerals A/S (Greenland), Red Rock Resources (London) and Hunter Dickinson (Canada). Joint research directly funded by the petroleum industry is targeted at solving specialist problems involving new laboratory-based research methods, for example exemplified by **Tosca**, with fundamental research into depositional systems offshore Brazil region for Petrobras. We also provide consultancy analytical services through CERSA Ltd.

In summary, our approach to impact is grounded in the production of research within an environment of policy and practitioner engagement and participation. Thus the insights gleaned reflect the real world needs of users outside the academy, while still being founded on good academic research.

c. Strategy and plans for supporting impact

As a community of researchers our goal is to contribute to societal well-being, economic growth and environmental sustainability, through mainstreaming impact in our research design.

Our goals over the next REF period are:

1. to sustain the unit's long-standing tradition of public engagement through media, interpretation and work with schools
2. to broaden the number of staff members engaged in substantial, pro-active impact projects, using the approaches outlined in B, will see impact goals routinely integrated into early-stage research planning for new projects
3. to expand the reach and scope of what we view as the most promising of our existing research, to ensure projects have the deepest impact possible
4. to increase our engagement and work with policy makers and industry.

Our strategy for achieving these goals has involved ensuring that we have an integrated and comprehensive approach to impact that encompass the approaches listed above, with all staff in the department linked with a knowledge exchange specialist. Thus,

1. we ensure that our research groupings draw on the University's services to support research impact by organising at least once a semester sessions that facilitate exchange with University Press Officers and Business Development Advisers.
2. from 2012 we resourced the part-time appointment of an impact catalyst officer to gather evidence of the impact of our research and to feed back to staff ways users' suggestions for increasing impact. Key staff members have also been identified to take forward important aspects of our approach to impact.
3. we have embedded impact activities as a central function of our core research structures. For example, in 2013 the school launched the Observatory for People, Place & Environment (OPPEn), designed to a) disseminate research findings beyond the academy and to coordinate user engagement and knowledge exchange (incorporating the model established by **Houston**

for the new *Scottish Cities Knowledge Centre)*, b) provide an environment that facilitates engagement between external research users and those working in our research centres through, for example, organising policy workshops and research briefing sessions (e.g. *Centre for Population Change* Briefing Papers is informing the 2013/14 Scottish constitutional change debate) and c) offer an arena that pro-actively facilitates the development of two-way relationships between practitioners and researchers in our areas of expertise.

4. we encourage engagement with industry on resource-related issues through investment in core facilities. For example, the Centre for Earth Resources St Andrews Ltd (CERSA) was launched in 2012 as a spin-out company aimed at developing commercial uptake on research in natural resources, environmental investigation and geochemical analysis. Consolidation of market position with business development for expansion into other sectors is planned in alignment with the growing research directions of the school, for example in geo-renewables.
5. we have specific initiatives planned for further outreach and public engagement, including the St Andrews Field Geology Academy (a new programme aimed at capitalising on the school's research into Scotland's rich natural heritage at world-class sites by offering this (field) laboratory as a training ground for the public and professionals from all over the world) and a programme of KE activities within CPC funded by the ESRC for a further 5 years from January 2014.

d. Relationship to case studies

All the case studies (CS) demonstrate how academic research, when developing in an environment designed to facilitate engagement with policy makers and industry, can be transformed from good science into tools of considerable utility and therefore have impact. Each case study - (1) 'Applying geochemistry to tackling the global tobacco epidemic', (2) 'A sea-change in geophysical-marine surveying for protecting our Ocean's future', (3) 'The construction and adoption of data zones as a new geography of Scotland', (4) 'Changing the way government identifies small areas of need and distributes funding in the UK and beyond' and (5) 'Establishing a blueprint for administrative data based longitudinal studies in the UK' - illustrates aspects of our approach to impact as outlined in B and C, although a considerable amount of the impact of the school's research is outside the Case Studies.

All the CS illustrate how close ***engagement with policy makers*** during the initiation and development of research can lead to its translation into practical tools for policy making. Governments need to measure aspects of society and the environment in order to make effective decisions – whether this is Scottish government (CS3, CS5), UK government (CS2, CS4) or the EU (CS1). These tools have to measure precisely and accurately the concept of interest to the policy maker whether that is the origin and content of tobacco, the marine environment or the service needs of citizens. The wide adoption of the tools described in the CS is testament to their efficacy.

CS2-5 illustrate how ***Knowledge Exchange (KE) practices*** are key in the translation process. These CS have all involved running significant programmes to train those not working in HEIs to make best use of the research tools and the databases that we have created. Without this knowledge exchange it is unlikely local and national government would have used the geographies, longitudinal data or indices of deprivation (CS3-5). Nor would industry and the third sector have adopted the techniques and data from CS2. Because CS1 describes a process for criminal detection, wide KE has naturally been avoided.

CS5 describes the creation of a study based on personal data. ***Participatory research*** has been vital in understanding the public's concerns and communicating the potential benefits of the study – to ensure public trust.

CS2 and 4 have both involved impact through ***mass communication*** – this has included traditional print, electronic medias, bespoke exhibitions and TV/ film productions. In addition CS2 illustrates how the school engages and ***connects with Industry.*** Through knowledge transfer and engagement with industry these new techniques in marine surveying have been taken forward commercially in industrial spin-outs.