

Institution: University of Glasgow
Unit of Assessment: B7 - Earth Systems and Environmental Sciences
Title of case study: Influencing Policy and Mobilising Communities Around Coastal Management, Geodiversity and Biodiversity
1. Summary of the impact

University of Glasgow expertise in coastal erosion has directly influenced biodiversity policy at local, national and international levels, delivered flood mitigation initiatives in partnership with public agencies in Scotland, and mobilised public support for environmental safeguards to preserve our natural heritage. Dr Jim Hansom has been instrumental in shaping UK environmental strategy to include geodiversity. In Scotland, he has worked with the Scottish Environment Protection Agency on flood assessments and the identification of Sites of Special Scientific Interest, helped to establish a charity mobilising community volunteers to monitor Scotland's coastline, and assisted Oxfam to allocate erosion prevention grants to local communities. Hansom's expertise has fed into the polemic protest film *You've Been Trumped* and a BBC Panorama special, bringing coastal geodiversity and biodiversity issues sharply into focus on a very public stage.

2. Underpinning research

The University of Glasgow has led research into the processes shaping Scottish rivers and coasts for more than two decades. This research has been undertaken by Dr Jim Hansom (Senior Lecturer 1990-92; Reader 1992-present), and Professor Trevor Hoey (Lecturer then Senior Lecturer 1992-2003; Professor 2003-present). They have made a series of significant contributions through various research projects commissioned by Scottish Natural Heritage (SNH), the Scottish Environment Protection Agency (SEPA), the National Trust for Scotland (NTS), the Centre of Expertise for Waters (CREW), the Engineering and Physical Sciences Research Council (EPSRC), the Joint Nature Conservation Committee (JNCC), the Natural Environment Research Council (NERC) and the Royal Society for the Protection of Birds (RSPB). This case study focuses on research that has had impact on policy and public awareness.

River and Coastal Geomorphology

The UK has some of the world's most sophisticated environmental legislation, the delivery of which is supported by a strong scientific evidence base. The University of Glasgow has provided key evidence in the fields of river and coastal geomorphology, across several key projects:

- River morphology: University of Glasgow research has refined approaches to modelling sediment transport, which leads to significant changes in river form (EPSRC to Hoey (Co-I) 2000-02). Further research examined this issue in specific river, river exit and coastal locations in Scotland (SNH to Hansom (PI) and Hoey, 1995-97).
- Coastal processes and sediment budgets: Understanding sediment delivery and removal processes in coastal environments (i.e. nearshore, beach, dune and river exits) is crucial for understanding wider coastal functioning. The quantification of sediment budgets (SNH to Hansom (PI) 1991-96, 2002), partnered with an understanding of the influence of past sea-levels on sediment supply and coastal function (NERC to Hansom (PI) 2002; SNH to Hansom (PI) 2006), revealed that sediment deficits have always played a pivotal role in coastal processes and their responses to changing sea levels.
- Coastal development trends: Coastal management decisions must be underpinned by knowledge of the impact of coastal function on past, present and future coastal landform development. Several research projects to establish coastal trends have had wide impact on the management of:
 - rivers and beaches - SNH to Hansom (PI) and Hoey, 1995-97
 - estuaries - SEPA/RSPB/SNH to Hansom (PI) 1999
 - dunes and machair - SNH/JNCC to Hansom (PI) 1996, 2002-04, 2007, 2009

Impact case study (REF3b)

Changing Sediment Budgets

Research commissioned by NTS, SEPA and SNH, sought to understand the normal patterns of coastal sediment transport by waves and tides and their impact on landform stability and erosion. In the course of this work Hansom used novel time-series Digital Terrain Models to accurately quantify, for the first time, the gains or losses of sediment from specific sections of beach, dune and saltmarsh (SNH report, 2011). SNH subsequently adopted this methodology, which led to the identification of widespread coastal steepening in Scotland resulting in increased coastal erosion, relative sea level change and loss of habitat. Hansom's 2011 work on sea level change outpacing land uplift in Scotland revealed that its coastlines are no longer buffered from the erosional and flooding impact of sea level change – a key game-changing message for Government and Local Authority policy-makers and planners. Hansom went on to develop a GIS-based coastal erosion susceptibility model to identify where the presence or lack of coastal defences and sediment transport modifies vulnerability to flooding and erosion. This methodology now informs the coastal flood and erosion risk management component of SEPA's Flood Risk Management Strategy (SEPA/CREW Research Report 2013 available from HEI).

Geological Conservation Review

The Geological Conservation Review is the process by which the key earth science sites in the UK are identified by experts in their field for conservation purposes. In 2007 Hansom was commissioned by SNH to assess the Foveran Links Site of Special Scientific Interest (SSSI), the Drum Links and Menie Links in Aberdeenshire. The research concluded that the dune systems of Forevan Links SSSI represent a valuable geomorphological asset. The Menie Links in the southern part of Forevan Links SSSI features a vast unvegetated sand sheet complex that has remained active for most of the 20th century. One of the least disturbed sand dune systems in Britain, its scale and dynamism makes it nationally and internationally unique, and so should be fully recognised as a Geological Conservation Review site.

3. References to the research

1. Hansom, J.D. (1999) The coastal geomorphology of Scotland: understanding sediment budgets for effective coastal management. In J. Baxter, K. Duncan, S. Atkins and G. Lees (eds) *Scotland's Living Coastline*, The Stationery Office, pp. 34–44. ISBN 9780114958565 [available from HEI] *
2. May, V.J. and Hansom J.D. (2003) Coastal Geomorphology of Great Britain. *Geological Conservation Review Series No. 28*. Joint Nature Conservation Committee, Peterborough, 754 p. ISBN 1861074840 [available from HEI]
3. Hansom, J.D., Lees, G., McGlashan, D.J. and John, S. (2004) [Shoreline management plans and coastal cells in Scotland](#). *Coastal Management* 32, 227–242.
4. Hansom, J.D. (2010) Coastal steepening around the Scottish Coast: the implication of sea level changes. *Scottish Natural Heritage Commissioned Report, Edinburgh*. [available from HEI] *
5. Hansom, J.D., Rennie, A.F., Dunlop, A. and Drummond, J. (2011) [A methodology to assess the causes and rates of change to Scotland's beaches and sand dunes - Phase 1](#). *Scottish Natural Heritage Commissioned Report no. 364, Edinburgh*. 140 p. [2004 submission, published by SNH in 2011] *
6. Rennie, A.F. and Hansom, J.D. (2011) [Sea level trend reversal: Land uplift outpaced by sea level rise on Scotland's coast](#). *Geomorphology* 125, 193–210.

* best indicators of research quality

4. Details of the impact

University of Glasgow research on Scottish rivers and coasts has shaped policy and strategy and empowered communities to manage their environment. These impacts are detailed below:

Influencing UK biodiversity policy

In the UK over 30% of priority species and 40% of priority habitats are in decline. A goal of the UN Environment Programme's Convention of Biological Diversity Strategic Plan (2010) is that by 2020 all 190 signatory countries must have national plans in place. These plans are to protect biodiversity and integrate biodiversity values into national and local regulatory, development and planning processes. In 2011 Hansom was lead author of the Coastal Margins chapter and contributor to the Regulating Services chapter of the *UK National Ecosystem Assessment (NEA)* which, for the first time, quantified the monetary value of the natural environment, and recommended 30- to 100-year management strategies. The NEA quantified the value of the geodiversity of the UK coastline at £48 billion, thus clarifying its economic benefits and encouraging policy-makers to give coastal geodiversity equal weight in planning and management decisions.

This work has further contributed to the subsequent UK 2020 policy document. DEFRA's *Biodiversity 2020: A strategy for England's wildlife and ecosystem services* (2012), commits the UK government to reforming the planning system and 'retain[ing] the protection and improvement of the natural environment as core objectives' and promoting 'approaches to flood and erosion management which conserve the natural environment and improve biodiversity'.

Erosion assessment, mitigation and adaptation

Glasgow research has influenced Scottish Government legislation on flooding and coastal planning. Hansom was responsible for the inclusion of coastal erosion vulnerability in SEPA's Flood Risk Management strategies. Hansom's research now informs the coastal erosion and flood risk strategies of SNH, SEPA, Scottish Government and all Local Authorities in Scotland.

In 2011, Hansom was appointed Coastal Science and Sustainability Advisor to Oxfam. He works with them on Scottish Government-funded pilot projects providing funds to local communities for plans to slow erosion rates and improve land drainage. Hansom discussed the projects with five local groups, including the Lochboisdale Amenity Trust, and sanctioned the release of grants to them. He ran several adaptation workshops with local crofting groups and, at Castlebay High School on the Isle of Barra, gave wave-tank model demonstrations to classes over a week-long workshop programme. Hansom also took part in a short video in partnership with the Western Isles Council for Adaptation Scotland, a Scottish Government programme reviewing a variety of projects under the theme of '[Scotland's Climate Story](#)', (see video entitled '[Adapting to Climate Change in the Western Isles – Jim's story](#)'). As of 31 July 2013, there had been 5,500 video views on the project's Facebook page.

The next phase of this programme will be an Oxfam-led full scale Scottish Government Climate Challenge Fund project to build upon and extend the success of the pilot. Hansom will write the technical approach sections of the bid and advise on the roll-out of programmes to slow down or mitigate coastal erosion and flooding impacts, whilst advocating the introduction of more radical adaptation strategies.

Mobilising communities to conserve the coastal environment

Drawing on his established expertise in mapping coastal development trends, Hansom has led community engagement projects on coastal management throughout Scotland. He is one of the founding directors of [SCAPE](#) (Scottish Coastal Archaeology and the Problem of Erosion), a registered charity funded by Historic Scotland, the Crown Estate and the University of St Andrews. SCAPE mobilises individuals and communities to protect sites of archaeological interest in Scotland's coastal areas. Hansom advises on SCAPE projects including SCH@RP ([Scottish Coastal Heritage at Risk](#)), which uses a smartphone app ('ShoreUpdate') and interactive map to enlist volunteer citizen scientists (there are currently 460 volunteers) to help monitor 'priority sites'. As of 31 July 2013, 264 sites had been surveyed by volunteers, and they had donated £35,775 to the project. Launching SCH@RP in 2012, Fiona Hyslop MSP, the Cabinet Secretary for Culture and External Affairs in Scotland, stated: "SCAPE has led the field in highlighting the erosion of coastal sites and it is a credit to its members and research that it has found a way to use incredibly

Impact case study (REF3b)

accessible mobile technology to improve the national records through the creative use of local expertise.” The ShoreUpdate app is available for Apple and Android, and has been rated 4-star on Android; it has been downloaded 200 times since launch.

The controversial proposal by Donald Trump to build a golf course on the environmentally protected Menie Links in Aberdeenshire represented a high-profile conflict between economic and environmental interests. The site was designated European Geological Conservation review status, as recommended by [Hansom's 2007 report for SNH](#). This contributed to Aberdeenshire Council turning down Trump's planning application for development work, which would have destroyed the geomorphological importance of the site. Following a public enquiry in June 2008 the Scottish Government unprecedentedly reversed this decision, prompting a significant protest campaign led both by local residents and organisations including SNH (whom Hansom represented at the Trump public inquiry), the Ramblers Association, RSPB and the Scottish Wildlife Trust.

This case inspired filmmaker Anthony Baxter to create the documentary [You've Been Trumped](#) (2011). The film includes significant contributions from Hansom. *You've Been Trumped* has won 15 International Film Festival awards, received more than 130 reviews and features in newspapers around the world, and has been translated into Chinese, Polish, Croatian, Czech, Italian, and Finnish. A public [petition](#) calling for a Scottish Government inquiry into the Trump case has gained 19,537 signatures. [BBC Panorama](#) broadcast a programme investigating the reasons behind the approval of the Trump project which meant “sacrificing an environmentally protected part of the Scottish coastline”. The Menie site's special status, as defined by Hansom's underpinning research, was the starting point for an examination of the planning and approval process in both the film and programme in the public campaigns and international press coverage.

5. Sources to corroborate the impact

Corroborating influence on UK biodiversity policy

UK National Ecosystem Assessment (NEA) report Chapter 11 on Coastal Margins ([link](#)) (showing Hansom as one of the Lead Authors)

DEFRA Biodiversity Strategy 2020 ([link](#)) (pg 4 refers to the 'groundbreaking' UK NEA report to which Hansom contributed)

BBC News, 2 June 2011: 'Nature "is worth billions" to the UK' ([link](#))

Scottish Natural Heritage, Coastal Geomorphologist (contact details provided)

Corroborating contribution to erosion assessment, mitigation and adaptation

Senior Policy Officer, Flood Risk Management, SEPA (contact details provided by HEI)

Oxfam, Climate change lessons from Britain's shores ([link](#)) (citing University of Glasgow involvement)

Head of Oxfam Scotland (contact details provided by HEI)

Other: public engagement and debate

Manager of the SCAPE Trust (contact details provided by HEI)

Director of You've Been Trumped: The Movie (contact details provided by HEI)