1 INTRODUCTION

Landscapes characterised by a substantial presence of aeolian (wind-blown) sand are predominantly coastal, and range from active dunefields with high and unstable relief, to smoother and more stable grassed surfaces which may be subject to some degree of agricultural use. Some are remote and inaccessible, but others exist in closer proximity to conurbations and tourist areas, and the impact of visitors is therefore comparatively great. In addition to the ever-present scouring and redistributing forces of sea and wind, other pressures on the stability of these landscapes include aggregates quarrying, development and the ubiquitous presence of wild burrowing fauna, most obviously the rabbit. Sand creates dynamic 'soft' landforms which are subject to continuing change, to the extent that photographs or maps of just 100 years ago often present very different topographies from those visible today. The encroachment of the sea and continual process of wind-induced change can transform a sand landscape almost overnight. In depositional strata, long periods of stasis may be represented by comparatively shallow soil horizons, which are frequently separated by much deeper bands of sand which may result from wind-blow episodes of far shorter timescale (Gilbertson et al 1996, 72–8). Dune systems frequently occupy zones of extensive past settlement attraction with numerous environmental advantages, and therefore occur in areas of generally high archaeological potential. Yet their complexity and extreme vulnerability present us with serious problems in terms of balancing an understanding of the archaeology with conservation strategies.

Many of our most complex ancient monuments and sites are literally built on sand, and a short excursion along almost any of Scotland's eroding sandy shores will reveal some sort of archaeological deposit in the process of weathering and crumbling away. A consensus that future climate change will dramatically increase the vulnerability of these delicate coastal landscapes by raising sea levels around Scotland, coupled with the distinct possibility of increased storminess, adds urgency to the situation. To balance the general perception of a gloomy climatological prognosis, techniques of archaeological prospection and investigation are advancing apace, offering the prospect of a much more comprehensive understanding and characterisation of the archaeological resource inherent in sand landscapes, and therefore pointing towards more informed and effective curatorial strategies in future.

Archaeological excavations of eroding Bronze Age farms and Iron Age farm mounds on the machair coast in the early 1980s have provided a wealth of detail about both archaeological potential and formation processes (Barber 2003). These excavations stemmed in part from two earlier coastal surveys, neither published. Over the past decade, however, Historic Scotland has sponsored and commissioned many Coastal Zone Assessment Surveys, all to one specification (Historic Scotland 1996), which now cover about 30% of Scotland's coastline, including many sand-covered areas. The proceedings of a seminar entitled *Coastal Archaeology and Erosion in Scotland* in November 1998 were published on the HS website in 2003 (Dawson (ed.) 2003) and are available in print (Dawson (ed.) 2005). The results of individual surveys are available on the SCAPE Trust website, www.scapetrust.org, and they include more recent work on the machair areas of the Uists and Benbecula, as well as surveys on Barra and Vatersay published in 1998 (Moore & Wilson 2005; CFA Archaeology 2005; Branigan & Grattan 1998). Other surveys, in northern Scotland, Orkney and Shetland, include smaller sand-covered areas and these too are available on the SCAPE Trust website. Historic Scotland has also grant-aided the SEARCH project almost from its inception in 1988, supporting major investigations on Barra and Vatersay (Branigan & Foster 2000), and at Cill Donnain, Cille Pheadair (Parker Pearson & Smith forthcoming), Dun Vulan (Parker Pearson & Sharples 1999), Cladh Hallan and Bornais (Sharples 2005) which, taken together, provide documentation of the effects of erosion by wind and waves.

A more recent coastal conference at St Andrews, in 2004, focused more specifically on long-term issues: archaeological and cultural resource management research, community involvement and funding.

The present collection of papers stems from a one-day seminar entitled 'Aeolian Archaeology: the Archaeology of Sand Landscapes in Scotland', which was sponsored and hosted by the Society of Antiquaries of Scotland as part of its specialist seminar series and held at Historic Scotland's offices in Edinburgh on 14 May 2004. The seminar was convened and co-chaired by Patrick Ashmore and David Griffiths, and the excellent arrangements for the day itself were mostly due to the organisational skill of Fionna Ashmore, as one of the last flourishes of a distinguished term as Director of the Society of Antiquaries of Scotland before her retirement in mid-2004. The editors are grateful to her successors, Andrea Smith and Simon Gilmour, for continuing to oversee the progress of this publication.

Our motive in proposing the seminar was to learn more about the experiences of others who have been in working in sand landscapes from a variety of academic and professional backgrounds, and

to help to establish some common methodological ways forward in understanding and characterising this most interesting but challenging type of environment. It was based upon the realisation that the accumulated wisdom of archaeologists alone was not broad enough to provide a sound basis for future research and management. The gathering was therefore consciously multi-disciplinary – too rarely do archaeologists, geomorphologists, climatologists, environmental scientists, public curators and landscape managers from diverse disciplinary backgrounds sit together in a seminar room and confront each other with the adequacy of their knowledge.

We consciously sought in the seminar to present case-studies which encompass the widest possible range of relevant methodologies, and at least to touch on most of the facets of Scotland's diverse coastal geography. Following a welcoming address by Lisbeth Thoms, President of the Society of Antiquaries, the introduction to the day and the curatorial perspective on the inherent challenges represented by sand landscapes from Historic Scotland's perspective were laid out (Ashmore). A historical and current overview of the state of archaeological methodology (Griffiths), and the accumulated benefit of long experience excavating sand sites were then provided (Barber). Lively debate followed. Recent climatological insights into historical wind-blow patterns (A Dawson), were succeeded by a summary of a recent large-scale excavation programme in machair (Parker Pearson et al). Several discussion contributions followed (all based on work published elsewhere – hence not published here): Professor William Ritchie of Aberdeen University gave an overview of his own extensive research into the geomorphology of Scottish coastal landscapes; Graeme Warren of University College Dublin summarised his research on Mesolithic archaeology in the Sands of Forvie (Aberdeenshire); Sandy Winterbottom of Stirling University gave an insight into the use of aerial remote sensing techniques in machair landscapes on Coll and Tiree (Inner Hebrides) and insights into luminescence and radiocarbon dating techniques in sand were provided by Jean-Luc Schwenninger of RLAHA, Oxford, and David Sanderson of SUERC, East Kilbride. A concluding discussion rounded off the day.

Speakers were encouraged to supplement Scottish case studies with reference to relevant studies outside Scotland. It was therefore inevitable, given the broad scope of the seminar, that its detailed geographical coverage could be far from exhaustive. Many who attended the seminar but did not give papers were quite as well-qualified to do so as the speakers themselves. Areas, projects and people who have much to contribute to this debate therefore go unrepresented in the following published proceedings. However, the eventual content of the publication encompasses work which was not presented at the seminar (T Dawson et al).

The substantial body of work outlined above, and alluded to in the various papers in this publication, demonstrates that, although some sites have been deflated by aeolian erosion and other destructive processes, others contain substantial accumulations of anthropogenic and natural layers. They also demonstrate that point-in-time surveys like the Coastal Zone Assessment Surveys in this mobile environment will be difficult to compare with previous and future surveys. One challenge for the future, perhaps best addressed by geophysical techniques, will be to find efficient and economical ways of distinguishing sites where much deflation has occurred from those which retain coherent archaeological layers.

The archaeology of sand-covered areas cannot be interpreted without an understanding of site formation processes, which are intimately bound to those of the sandy areas. The feasibility of interdisciplinary projects has been demonstrated by, for instance, the long-running SEARCH project in the Western Isles. Our hope is that publication of this seminar will help us to develop new research approaches to allow us to build on those past achievements.

2 REFERENCES

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