

# HEART OF NEOLITHIC ORKNEY WORLD HERITAGE SITE

Research Strategy 2013-2018



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March 2013

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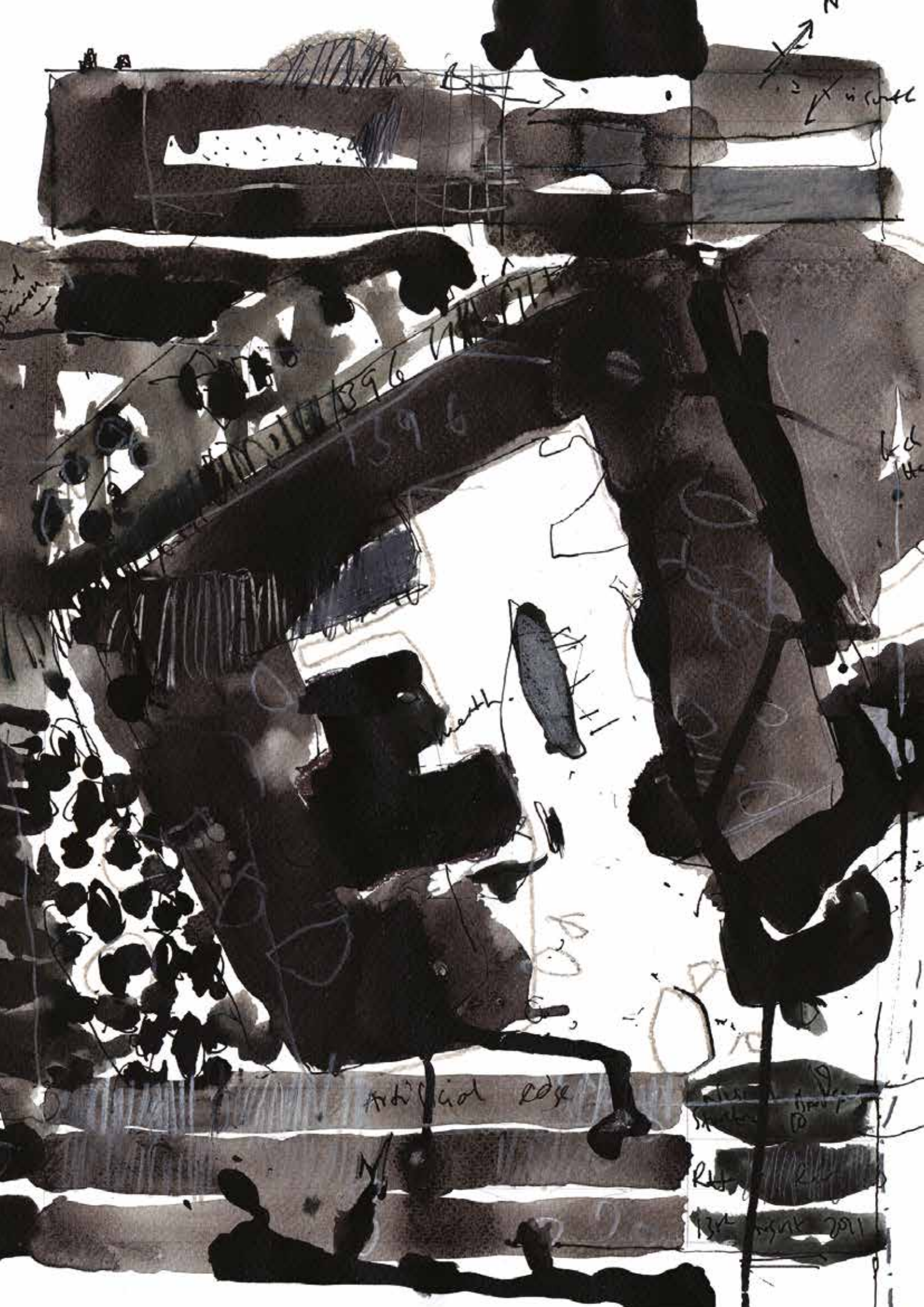
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# PART 1

## 1.0 Introduction

- 1.1 The Heart of Neolithic Orkney World Heritage Site comprises six Neolithic archaeological sites in Mainland, Orkney. These are: Skara Brae settlement, Maeshowe chambered tomb, the Stones of Stenness, the Ring of Brodgar and associated monuments, the Watch Stone and the Barnhouse Stone. All of these sites are in the care of Historic Scotland (HS) on behalf of Scottish Ministers. The Heart of Neolithic Orkney World Heritage Site (HONO WHS) was inscribed on the World Heritage List on 2nd December 1999.
- 1.2 Research plays a key role in the management of the World Heritage Site (WHS) and its setting: knowledge and understanding of the site and its context underpin and inform all management and development decisions. The 2005 Heart of Neolithic Orkney WHS Research Agenda, with its Research Strategy (part 5, 120-137), was not designed as a static document, rather a framework capable of reflexive change over time, subject to 'periodic reviews... so that the Agenda and Strategy retain relevance and currency.' (Downes et al 2005, 24) Objective 18 of the WHS Management Plan 2008-2013 (HS 2008b, 14-15) sought the re-establishment of the Orkney World Heritage Site Research Core Committee (OWHSRCC) which had as its remit the task of developing research priorities and monitoring progress of research objectives annually.
- 1.3 The OWHSRCC was re-established in 2010 with the intention of building upon preceding work. Its first undertaking was to organise a symposium to review the Heart of Neolithic Orkney WHS Research Agenda, with specific reference to the Neolithic. The review process aimed to produce a revised Research Strategy based on an evaluation of the 2005 Research Agenda. The research symposium *Neolithic Orkney 2000-2010* was held in Kirkwall on 15th and 16th November 2010, the results of which were synthesised and re-categorised by the OWHSRCC in March 2011 to mesh with the timeframe of the 2012/13 Management Plan review (HS 2008a, 4).
- 1.4 This revised Research Strategy should be made use of with the 2005 HONO WHS Research Agenda (Downes et al 2005) and the HONO World Heritage Site Management Plan 2008-2013 (Historic Scotland 2008 a and b), until publication of the 2014-19 HONO WHS Management Plan (forthcoming).
- 1.5 The 2005 Research Agenda included a detailed Resource Assessment which encompassed sites of all periods within the WHS, and its then Inner Buffer Zones (IBZ) (see 3.1.3). The resource assessment element of this revised Strategy was the symposium, *Neolithic Orkney 2000-2010*. The focus on the Neolithic was adopted because of the development of Neolithic research and significance of recent findings for the HONO WHS.
- 1.6 The 2013 Research Strategy is a review and update of the 2005 HONO WHS Research Agenda comprising:
  - a review of the 2005 Research Strategy contained in the 2005 HONO WHS Research Agenda (part 5, 120-137)
  - an updated Research Strategy for the HONO WHS
  - a review of research undertaken in the intervening period
  - a list of potential projects
  - an updated bibliography for the HONO WHS
- 1.7 Also included in the 2013 Research Strategy are summaries and illustrations from a sample of the projects presented at *Neolithic Orkney 2000-2010*.



## A Taphonomic Study of Human Remains from Neolithic Orkney



Figure 1 Human skull from Cuween chambered cairn, Orkney. Image © Rebecca Crozier

A detailed taphonomic investigation of human remains from Neolithic Orkney has illustrated that fewer individuals are represented than previously understood and the practice of excarnation is no longer a tenable interpretation. The chambered cairn of Quanterness (HY417129) is situated on the Mainland of Orkney in the parish of Kirkwall and Cuween chambered cairn (HY364127) on the Mainland of Orkney in the parish of Firth and recent analysis of the human remains from both has uncovered new information to challenge current interpretations of the mortuary practices associated with these tombs.

**Funders:** Historic Scotland, School of Geography, Archaeology and Palaeoecology, Queen's University, Belfast

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### Orkney's First Farmers: examining Neolithic human remains from Orkney

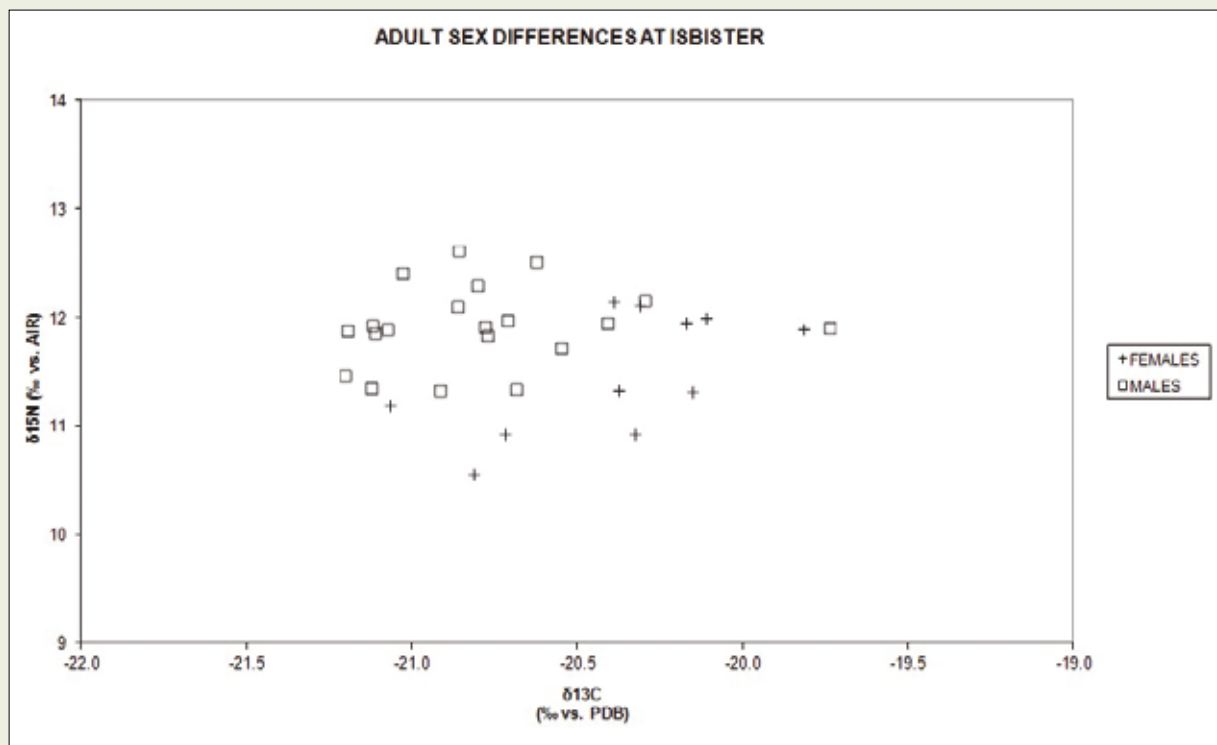
Examination of Neolithic human bones from Isbister and other Orcadian tombs indicated the presence of several forms of pathological lesions, notably including cranial deformation (from premature craniosynostosis), neoplastic diseases, violent trauma and scurvy. Several individuals will have suffered disability.

The assemblages do not reflect a random selection from a normal population but indicate selection according to age and sex. Adult males outnumber females by about 2:1 and there are relatively many older children and young adults compared with infants, older juveniles and older adults. It is possible that selection related to violent death but may more likely have been related to disease or disability.

There is no evidence to suggest selection of any particular skeletal elements, nor of exposure to the elements or animal scavenging: it is probable that whole bodies were interred. Ironically, this may imply the use of exposure in the Neolithic, to account for the majority of individuals who are missing. The number of individuals that can be demonstrated from Isbister is only 85.

Stable isotope analysis suggests dietary differences between adult males and females. The intake of animal protein by females was lower than males and related to a marine signal that was not present among males (see Figure 2). Child weaning seems likely to have occurred at about four years old and animal protein intake varied with age.

An innovative incremental sampling for fine age resolution of isotopic values was devised, exploiting the gradual growth of teeth without remodelling (see Figure 3). This identified a hitherto unsuspected intrauterine signal dominated by high  $\delta^{15}\text{N}$  associated with high  $\delta^{13}\text{C}$ , which was followed by reduction around birth. It is possible that adult variation followed a periodicity related to female use of marine animal protein, which may have been associated with the procreative cycle.





$\delta^{15}\text{N}$  is associated with trophic level (a high result suggests greater trophic level);  $\delta^{13}\text{C}$  is associated with protein origin (lower is associated with terrestrial foods, higher is associated with marine foods). The females exhibit a linear distribution suggesting that animal protein was derived from marine sources; the males have a more random distribution, suggesting greater terrestrial animal protein consumption.

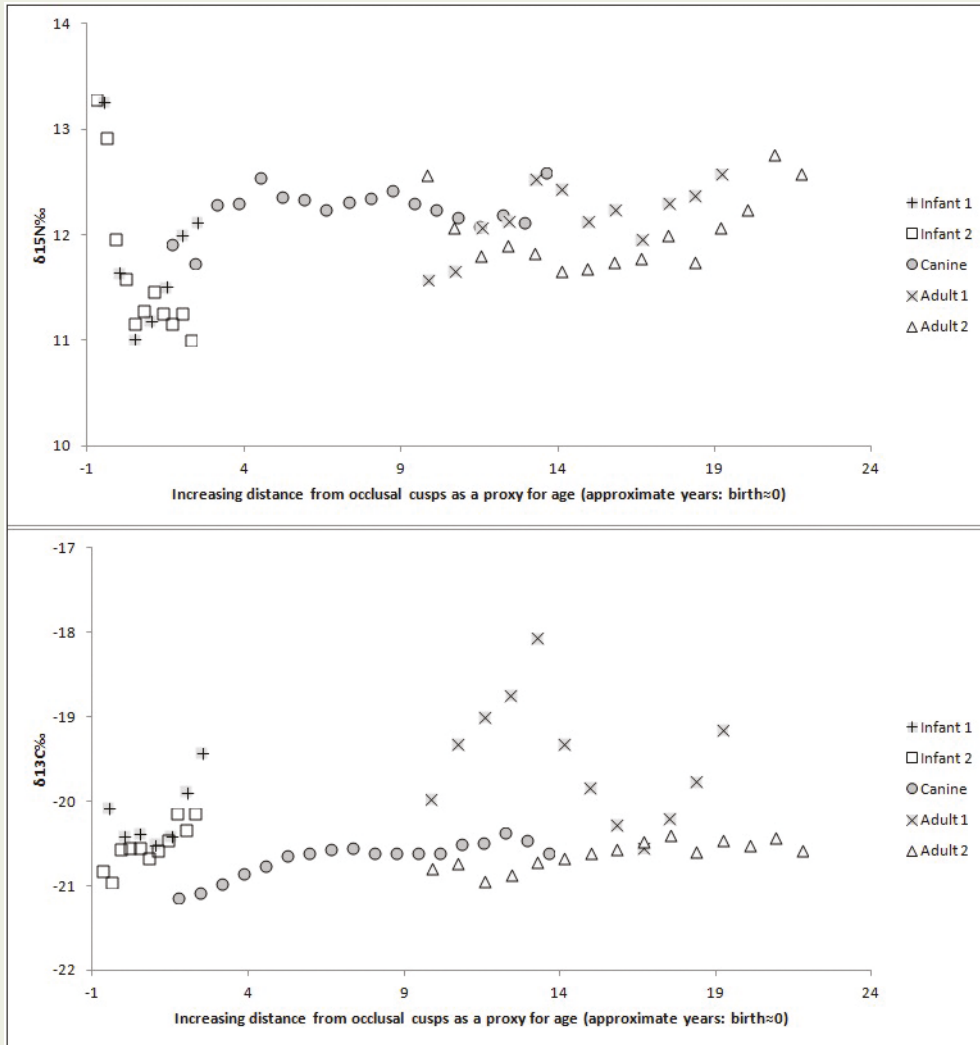


Figure 3 Age-related variation in stable isotope signals from dental increment samples – a composite plot from five teeth developing over different age ranges (probably at different rates). © Dave Lawrence

The x-axis is labelled with approximate age in years, starting before birth, using distance from the occlusal cusp as a proxy but calibrated approximately according to the likely age of development. Birth is at about 0. This permits detailed observations, including:

The very high initial  $\delta^{15}\text{N}$  signal in the two infants has never been noted previously and does not fit existing models of metabolism. There is an expected drop around birth, followed by a trophic level signal in the canine and infant 1, which is probably associated with breastfeeding – interestingly not exhibited in infant 2. Adult 1 exhibits fluctuation in  $\delta^{13}\text{C}$  that is associated with  $\delta^{15}\text{N}$ , which suggests marine protein intake at defined periods, possibly starting around puberty; adult 2 has an increase in  $\delta^{15}\text{N}$  unrelated to  $\delta^{13}\text{C}$ , which suggests increased animal protein intake with adulthood.

**Funding:** AHRC-funded collaborative doctoral award to the University of Bradford and Orkney Museum

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## PART 2

### 2.0 Research Strategy Review

#### 2.1 BACKGROUND

- 2.1.1 This review provides an evaluation of the 2005 research themes, topics and projects, and builds on the evaluation and recommendations of the Management Plan 2008-2013. In order to do that, the research themes, topics and projects in the 2005 Strategy have been outlined, evaluated and conclusions drawn regarding how research has been forwarded within these themes. An updated project listing, bibliography, and list of research topics and research projects as at **May 2012** form Appendices A to E of this document.
- 2.1.2 The Research Strategy review evaluates what research has been undertaken since 2005. The existence of research into any topic does not represent the finality of research into that topic but 'invites both the intelligent amplification of what we already know and the acquisition of new knowledge' (Renfrew in Downes et al 2005, 13) and thus research into any topic is an ongoing and open-ended process.
- 2.1.3 This section provides an assessment of the extent to which these various topics and projects have been researched up to **May 2012**. Appendices A and B provide detailed status reports on the research topics and projects respectively and indicate which are published pieces of work and which are ongoing.
- 2.1.4 In order to update the existing Research Agenda, and to undertake this evaluation, the extended bibliography of the 2005 Research Agenda has been updated (Appendix C). Appendix D is a table of archaeological projects undertaken in Orkney between 2004 and May 2012 which incorporates Appendix C in the 2008 Management Plan, which is in turn an update of Appendix 4 in the 2005 Research Agenda.
- 2.1.5 Conclusions from the Research Strategy review are to be found at the end of this section after the evaluation of topics and projects, at Section 2.5.

#### 2.2 OUTLINE OF THE 2005 RESEARCH THEMES

- 2.2.1 The 2005 Research Strategy identified two broad themes into which all traditional themes were bound (Downes et al 2005, 121-2). These two themes were:
- **Artefacts, Monuments and Cultural Identity**, including groups of artefacts and the monuments themselves thus removing often-applied distinctions of scale and time.
  - **The Formation and Utilisation of the Landscape**, encompassing the different processes which have resulted in the creation of the present-day landscape and all previous landscapes.

Sample Research Topics were detailed within these two themes, and sample projects totalling 91 listed in geographic zones: Site specific; WHS specific; Zone specific; Orkney specific.

- 2.2.2 The research topics and projects listed are evaluated below, in line with the 2005 framework and theme structure.

## PART 2

### 2.3 EVALUATION OF THE RESEARCH TOPICS

#### ***Theme 1: Artefacts, Monuments and Cultural Identity***

- 2.3.1 Appendix A shows that of the 20 research topics identified under Theme 1, Artefacts, Monuments and Cultural Identity, five have not been researched to any extent. The research remit of all 20 topics was Orkney-wide and the timescale deliberately broad. As one might expect the majority of the research has been focussed on the prehistoric period, but several studies have concentrated on the medieval and later periods and/or have been landscape and multi-period in their approach, as well as there being contemporary studies of experience and art.
- 2.3.2 The five topics which have not had any research associated with them are not purely archaeological. These topics are (a) research into local history of the WHS, (b) research into its literature, (c) research into its folklore, (d) research into the astroarchaeological significance of the WHS and (e) visitor surveys of unstaffed HS properties. Aspects of local history, literature and folklore have been researched as individual projects but syntheses, as suggested in the 2005 Research Strategy, have not occurred. The significance of the alignment of Maeshowe with the winter solstice features in Richards' Barnhouse and Maeshowe publication, 'Dwelling Amongst the Monuments' (2005) but no specific research has considered the WHS in terms of celestial events. Research of HS properties has focussed on the staffed sites of Maeshowe and Skara Brae with unstaffed sites, e.g. Ring of Brodgar, Standing Stones of Stenness remaining unstudied.
- 2.3.3 Within Research Theme 1, the majority of studies are landscape-related reflecting the increased popularity of this approach. Specifically a new topic of 'art and archaeology' has emerged, resulting in several projects including 'Symbols in a Landscape' (Hammond, Appendix D), a collaboration between The Pier Arts Centre, Orkney College University of the Highlands and Islands (UHI) and HS, an artist in residency programme working closely with the excavations at the Ness of Brodgar and with PhDs researching interpretation, image making and inscription as social practice (Thomas, Watterson, appendix E). These projects are focussed around the WHS monuments, and work at the Ness of Brodgar (Card et al 2008, 2009, 2010).
- 2.3.4 The Ness of Brodgar, excavation of a late Neolithic site of monumental proportions located between the Ring of Brodgar and the Stones of Stenness, directed by Nick Card, Orkney Research Centre for Archaeology (ORCA), was unknown in 2005. This site is adding greatly to our understanding of Neolithic architecture, and to the range and nature of Neolithic material culture. The excavation is complemented by that being undertaken by EASE for Historic Scotland on the late Neolithic settlement at the Links of Noltland.

#### ***Theme 2: Formation and Utilisation of the Landscape***

- 2.3.5 Eleven Sample Research topics were set out in the 2005 Research Strategy under Theme 2. Appendix A shows that all eleven topics have been researched to some extent. The Rising Tide Project (Wickham-Jones et al 2008, 2009, 2010) has been instrumental in the collection of new data concerning several of the topics including soil formation, landscape modelling and climate change. Several current PhD students are researching environmental topics within Orkney's prehistory using material from recent excavations such as Braes of Ha'Breck in Wyre and Links of Noltland in Westray (Appendix E).
- 2.3.6 The creation of an inventory of previously excavated bioarchaeological evidence has not been achieved, although the cataloguing and relocation of archaeological material at the Orkney Museum has made considerable progress in this area, through the temporary appointment of an archaeological cataloguer during 2010 to 2012. Museums and other institutions outwith Orkney hold a variety of materials from Orkney sites, including Skara Brae, the Links of Noltland and Rowiegar. The external collections relate mostly to artefacts from excavations that occurred

prior to the 21st century but which nevertheless offer real opportunities for new research, e.g. the various human bone collections, including cremated material. Also see Crozier, Appendix E. The full list of holders of Orcadian material is not yet collated.

- 2.3.7 An emerging area of research since 2005 is sustainability. Several colloquia drawing international participation have focussed on issues such as site management and coastal erosion at the WHS, for example, the 'CoastAdapt' (Northern Periphery Programme) Orkney Workshop jointly hosted by University of Aberdeen and Orkney College UHI on 16th-18th March 2011 and *Sustainability and Heritage: How Can the Past contribute to a Sustainable Future?* International Conference organised by UHI and Global Human Ecodynamics Alliance, held on 29th-30th May 2012.

## 2.4 EVALUATION OF THE SAMPLE RESEARCH PROJECTS

- 2.4.1 The 2005 Research Agenda further outlined 91 Sample Research Projects which were divided into the two broad themes of Artefacts, Monuments and Cultural Identity and Formation and Utilisation of the Landscape discussed above. Within these two themes, as above, the projects were further divided into four geographical frameworks: site specific research; WHS specific; zone specific; and Orkney specific.

- 2.4.2 Appendix B lists the 91 Sample Research Projects and gives a status report of each project. A summary of these findings is provided below. The numbering of the Sample Research Projects, in brackets below, follows that of their numbering in the HONO WHS Research Agenda 2005, pp. 128-131.

### ***Theme 1: Artefacts, Monuments and Cultural Identity: site specific***

- 2.4.3 Twelve of the 17 Sample Projects have been researched in part. Much of the research arises from the recent excavation of the ditch at the Ring of Brodgar (Downes and Richards 2008; Downes, Richards and Thomas 2008) and the findings published in Richards' 'Dwelling Amongst the Monuments', the excavation report for Barnhouse and Maeshowe (2005). Of the Sample Projects which have not been researched, three are specific to Skara Brae, being midden analysis (Sample Research Project no 12), functional analysis of occupation surfaces (13) and analyses of site taphonomy (14). The remaining two projects are hydrological research into the status of the mound at Maeshowe (10) and histories of each WHS monument (5), but new information provided by the excavations at Brodgar and Maeshowe has increased knowledge of these monuments and thus improved understanding of the life histories of the sites.

### ***Theme 1: Artefacts, monuments and cultural identity: WHS specific***

- 2.4.4 Five of the 12 Sample Projects have been researched in part. There has been a concentrated programme of geophysical survey, carried out by Orkney College Geophysical Unit (OCGU), focussing on the Inner Buffer Zone (IBZ)/Buffer Zone (see 3.1.3) of the WHS (defined in 2001 Management Plan) which has assisted in the locating of new sites as well as producing more detailed results for existing sites. Excavations at Bookan (Card 2005) and the Ness of Brodgar (Card et al 2008, 2009, 2010) have produced information to assist in better understanding the chronological position of sites related to the WHS, as has the publication of the excavations at Barnhouse (Richards 2005). The seven Sample Projects not yet researched are specific databases cataloguing photographs (20), archive and museum material (18), and historical, oral history and cartographic sources (19) relating to the WHS. However, updates and additions to the National Library of Scotland (NLS) online cartographic sources, CANMORE, Orkney Archive catalogue and the Orkney Museum catalogue have made searching for such information more accessible and rewarding. A collation of the pictorial sources has been undertaken by Thomas in a Royal Society of Edinburgh (RSE) funded project (Appendix D). The fieldwalking programme has not



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continued (28 & 29), nor have place names (27) and oral history (25) been gathered in the WHS. Dye (2009), and Timoney (2009) have considered the WHS in contemporary society, following on from McClanahan's earlier work (2004, 2006a, 2006b), and Renwick is undertaking a related PhD (Appendix E).

### ***Theme 1: Artefacts, monuments and cultural identity: zone specific***

2.4.5 Five of the eight Sample Projects have been researched in part. The eight Sample Projects in this section are similar to those above and likewise the geophysical survey has been carried out by OCGU in their IBZ/Buffer Zone geophysics survey. The Birsay-Skail Landscape Project (Griffiths et al 2003 to 2011) has led to increased knowledge of the coast in the vicinity of Skara Brae and the Rising Tide Project (Wickham-Jones et al 2008, 2009, 2010) has undertaken underwater survey in the Loch of Stenness (Appendix D). As above, a fieldwalking programme (35 & 36) in this geographic sub-division has not occurred, nor has a programme of astroarchaeological research (30).

### ***Theme 1: Artefacts, monuments and cultural identity: Orkney specific***

2.4.6 Sixteen of the 21 Sample Projects have been researched in part. The five not researched cover the source material of artefacts (39), studies of Neolithic tools (not stone) (40), examination of natural pigments (45), examination of population change (47) and investigation of the influence of archaeology on literature (56). The remaining 15 projects have all been researched to a certain extent and seven of them are topics of current research projects. The cataloguing of artefacts (18) has been taken forward through the temporary appointment from 2010 to 2012 of an archaeological cataloguer in Orkney Museum. The Orkney Museum and Orkney Archive are in the process of creating a shared catalogue which, when complete, will provide a useful online resource for researchers. The Museum archaeological curator post is mothballed following the sad early death of the long-standing post-holder, Anne Brundle. Other museums have collections from Orkney, from the WHS and from the Orcadian Neolithic. Especially relevant is the National Museum of Scotland which holds the collections from the 1978-1981 Links of Noltland excavations and those from Skara Brae.

### ***Theme 2: The formation and utilisation of the landscape: site specific & inner buffer zone specific***

2.4.7 Site specific and Inner Buffer Zone/Buffer Zone specific (see 3.1.3) have been grouped together for this evaluation.

2.4.8 Five of the ten research projects have been researched in part. The remaining five have yet to be investigated, being: the agricultural history and formation of land boundaries of the WHS and zones (63), (65), (66) and (68) and the lack of specific inventories for data within the WHS area (64) but this is partly compensated for in the increased data available in national and local databases such as CANMORE and the Orkney Museum and Archive databases.

### ***Theme 2: The formation and utilisation of the landscape: Orkney specific***

2.4.9 Six of the ten Orkney specific Sample Projects have been researched to a certain extent, with three PhD students accounting for research currently being undertaken (Bishop, Mamwell, Potts, Appendix E). The colonisation of Orkney by mammalian fauna (78) has been researched in connection with Orkney voles in a major research project led by Keith Dobney of Aberdeen University. Farrell and Bunting (2008a, b and c, 2009a and b, 2010) and Farrell (2009) have researched the environmental prehistory of Orkney through pollen analysis (73) and Wickham-Jones and Dawson (2008a and b) and Wickham-Jones et al (2008, 2009, 2010) are researching sea-level change (74) and (75).

**Cross Theme: WHS Specific, Zone Specific and Orkney Specific**

- 2.4.10 The three cross theme sections (Downes et al 2005, 131) have been grouped together for evaluation. Eleven of the 13 projects have been researched to a certain extent, leaving the compilation of a GIS system (84) and the study of archaeological research from the Iron Age onwards in Orkney yet to be investigated (90). As with all the Sample Research Project sections there is an element of overlap with the Research Themes. The lack of WHS specific inventories (18), (19), (20), (81) has been compensated for by the inclusion of the Orkney Sites and Monuments Record (SMR) in CANMORE and the inclusion of WHS photographs in the RCAHMS National Collection of Aerial photography. The RCAHMS aerial survey of Orkney in 2009 has also provided updated aerial records for Orkney.
- 2.4.11 Considerable progress has been made towards the establishment of a centre for archaeology in Orkney (86), with the creation of ORCA, Orkney Research Centre for Archaeology in 2007 and its appointments of marine and environmental specialists leading to the recent creation of ORCA Marine. The teaching of Archaeology, both in terms of staffing and courses, continues to develop at Orkney College, University of the Highlands & Islands with an increase in undergraduate and post-graduate provision and students.
- 2.4.12 The establishment of an archaeology department and degree programme in the University of Aberdeen has impacted positively on research activity in Orkney.
- 2.4.13 The Orkney College UHI Archaeology Department has also effected a marked rise in volunteer effort and community and international engagement across Orkney especially around projects such as the Ness of Brodgar, The Cairns, Windwick, and Orkney Islands Council/Scapa Flow Landscape Partnership Scheme-aided projects such as the Hoy and Walls Landscape Project. The Ness of Brodgar in particular has attracted high levels of interest and involvement both in situ and by a wide range of media.
- 2.4.14 Although the post of community archaeologist (87) has not been created, there has been a temporary appointment of an archaeology and sustainable development project officer and a number of highly successful community led projects, all of which have received expertise and input from the County Archaeologist and others. A number of professional archaeologists have re-located to Orkney since 2005. This can be attributed, at least in part, to the upsurge in research precipitated by the 2010 symposium and 2005 Research Agenda.
- 2.4.15 Community-led initiatives have increased awareness of archaeology across the archipelago and made significant contributions to data collection and archaeology outreach. The following projects give an indication of the diversity of projects which have occurred: Hoy and South Walls Landscape Project; Scapa Flow Landscape Partnership Scheme; Symbols in a Landscape; NESTA Make It Local SMR project; Aviation Research Group Orkney and Shetland (Appendix D).

**2.5 CONCLUSIONS**

- 2.5.1 The period following publication of the 2005 Research Agenda has seen a considerable upsurge in research activity in and around the WHS, and in Orkney as a whole. In the past seven years archaeological research in Orkney, and in particular in the WHS and the IBZ/Buffer Zone (see 3.1.3), has adhered to the principles of sustainable research as outlined in the Research Agenda (Downes et al 2005, 120-1). The majority of the Sample Research Topics and Projects have been the subject of some study.

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- 2.5.2 The variety of research in terms of location within Orkney and time periods reflects the strength of recent and current archaeological projects. The WHS has been the focus of several large-scale projects as well as smaller projects, with the ongoing excavations at the Ness of Brodgar holding the highest profile. As well as period and site-specific research, the WHS features in other research in part meeting the desire to increase knowledge of the use of the monuments over time (5). The Things Project, for example, has considered the significance of Maeshowe as a possible Viking assembly site (Appendix D).
- 2.5.3 Important progress has been made since the publication of the Research Agenda and this can be seen in the extent to which the Sample Topics and Projects have been worked upon. Inevitably not all the Topics and Projects have yet had attention and those which have not been undertaken will be included, where appropriate, in the revised Research Strategy. They are:
- Artefact studies (physical and chemical; source materials; meaning and function; pigments).
  - Astroarchaeological meanings.
  - Visitor surveys of unstaffed HS sites.
  - Hydrological status of Maeshowe.
  - Analyses of middens, occupation surfaces and site taphonomy at Skara Brae.
  - Fieldwalking programme of the WHS and the IBZ/Buffer Zone (see 3.1.3) area and coastal surveys.
  - Population studies.
- 2.5.4 The extent to which landscape survey and visual representations have been researched reflects their recent popularity as research areas. In particular the visual representation research has led to new and exciting collaborations between archaeologists and artists and a widely accessible series of outputs reaching diverse audiences (2.3.3 above).
- 2.5.5 The creation of the Orkney Research Centre for Archaeology (ORCA) and its continued developments, in tandem with the teaching developments in the Orkney College UHI Department of Archaeology, have significantly enhanced archaeological provision and research in Orkney. The development of archaeology at Orkney College UHI and growth of a “community of practice” which encompasses researchers and professional archaeologists both resident in Orkney and from elsewhere, and the significant community involvement, creates components of an informal research infrastructure. This can all be linked to the inscription of the WHS which was a catalyst for this growth. A significant amount of the research has been undertaken by a number of other units and universities spread across Britain and elsewhere as set out in Appendices A to E.
- 2.5.6 Closer analysis of resourcing of research has not been undertaken: projects receiving small amounts of funding from various sources are in the majority, but amounts of leverage on these are usually high, and community engagement and public impact very positive with these projects. Historic Scotland funding has underpinned significant amounts of research especially that focussing on the WHS (e.g. continuing post-excavation analysis and writing up of Skara Brae excavations, excavation at the Ring of Brodgar), the Links of Noltland late Neolithic settlement on Westray and the Mesolithic/Neolithic site at Linkshouse, Stronsay. Orkney Islands Council’s excavation fund has been a key source of seedcorn funding for research throughout Orkney, and enabled several of the excavations which were major features of the *Neolithic Orkney 2000-2010 Symposium* to take place, these being: Ness of Brodgar, Sandwick; Braes o’ Ha’breck, Wyre; Knowes of Trotty, Harray.

- 2.5.7 The requirement for data sharing and sustained co-ordination of research to enhance the research infrastructure is clear. But, for example, a substantial proportion of research has been undertaken as postgraduate Masters topics which means that much of this work will not be published, and there is currently no GIS database for the area; therefore public access to a review of research, such as this document and the previous Research Agenda, is important, as is an enhanced SMR of the WHS and its Buffer Zone.
- 2.5.8 As can be seen from the Bibliography, Appendix C, and the project update, Appendix D, a significant proportion of the research undertaken since 2005 has in some way contributed to the Themes, Topics and Projects detailed in the 2005 Research Strategy. That is not to say that all researchers have referred directly to the Strategy when preparing their research proposals but rather that their research can be set within the framework of the comprehensive nature of the Agenda and Strategy. The decision to create an Orkney-wide Strategy including all time periods was made in order to position the Orkney WHS in its spatial and temporal context, and has ensured that a wide range of Orkney research has been eligible for evaluation in this Review. The broad scope of the 2005 Research Strategy aimed to encompass and utilise research undertaken at Neolithic sites elsewhere in Orkney in order to enhance our understanding of the Orkney WHS. There are restrictions on the data that can be obtained from the WHS monuments themselves due to poor preservation of, e.g. bone and pollen, limited or absent records from historical excavations, and the limits based on investigation by the conservation and access requirements of the inscribed monuments.
- 2.5.9 It is clear that research into the Neolithic in the WHS, the IBZ/Buffer Zone (see 3.1.3) area and elsewhere in Orkney continues to be important, but is lacking in coherently articulated aims vis-a-vis the WHS, and a strategy to address how individual investigations relate to one another, or could help support another, is absent. This absence of aims and connections may demonstrate that the aims of the Research Strategy were unrealistic, or reflect the lengthy moth-balling of the OWHSRCC during the period 2005-2010 – and thus underline the importance of the role of this group in addition to a general need for improved communications.



### Cuween-Wideford Landscape Project on Mainland Orkney

The project involved excavation at Stonehall, Crossicrown and Wideford Hill.



Figure 4 View of Early Neolithic houses on the knoll at Stonehall, which lies directly below and SE of Cuween chamber tomb, at HY 336126 in the Mainland Parish of Firth, and comprises a cluster of Early and Late Neolithic settlement features. Image © Colin Richards



Figure 5 View of House 1 at Crossicrown during excavation. Crossicrown (HY423137) is a mainly Late Neolithic settlement, located on the coastal plain between Wideford Hill and Kirkwall Bay, c. 1 km NE of Quanterness chamber tomb and within 200 m of the coast. Image © Colin Richards



Figure 6 View of the postholes comprising timber Structure 3 at Wideford Hill settlement (HY403125) which is of Early Neolithic date and lies on the lower slope of Wideford Hill, c. 700m NW of the chambered cairn. Image © Colin Richards

**Funding:** Historic Scotland, Orkney Archaeological Trust and Glasgow University

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### The Scottish Ten at the Heart of Neolithic Orkney World Heritage Site

The Heart of Neolithic Orkney WHS is made up of the chambered tomb of Maeshowe, the Stones of Stenness, the Barnhouse Stone, the Watch Stone, the Ring of Brodgar with its associated funerary monuments and the Skara Brae settlement. Together these form one of the richest surviving Neolithic landscapes in western Europe. Laser scanning of the Orkney World Heritage Site was carried out in August 2010 for the Scottish Ten project.

The Scottish Ten is an ambitious five-year project using cutting-edge technology to create exceptionally accurate digital models of Scotland's five UNESCO designated World Heritage Sites and five international heritage sites in order to better conserve and manage them.

The primary aims of the Scottish Ten project are to:

- Digitally preserve important historical sites for the benefit of future generations in Scotland and overseas.
- Share and promote Scottish technical expertise in conservation and digital visualisation.
- Foster international collaboration and build lasting partnerships that capitalise on cultural connections with Scotland.
- Provide 3D digital models and data to site staff to better care for the heritage asset.
- Create digital documentation and accurate 3D surveys of the sites for future development of innovative world-class and innovative research, education and management.

The unique partnership of Historic Scotland – the Scottish heritage agency – and The Glasgow School of Art's Digital Design Studio has developed to create the Centre for Digital Documentation and Visualisation LLP to carry out the project and undertake other commercial projects.

The laser scanning measurements allow us to identify problems and rate of decay of the monuments which we can then address quickly. We are also sharing this information with the non-profit conservation organisation CyArk to retain and use to promote interest and engagement with global historic monuments.

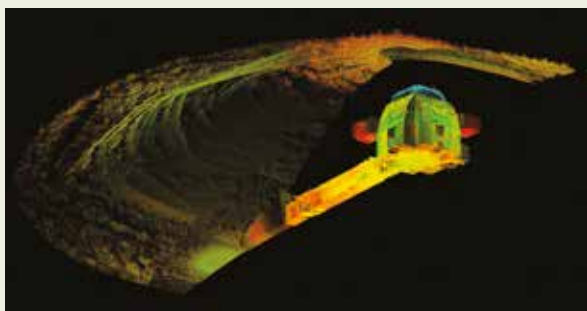


Figure 7 Cross-section through 3D point cloud data for Maeshowe chambered tomb, Orkney. The laser scan survey data allows monuments to be viewed in new ways. An interpretive virtual tour has been developed for Maeshowe, based on 3D models created from this accurate survey data. The tour is available on the Scottish Ten website [www.scottishten.org](http://www.scottishten.org). Image © Centre for Digital Documentation and Visualisation LLP.

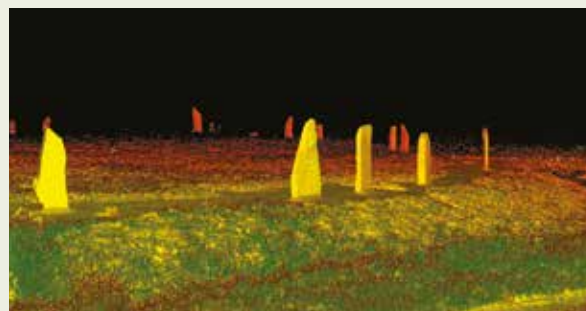


Figure 8 3D point cloud data for Ring of Brodgar, Orkney. Data collected during this survey is currently being used by Historic Scotland's architects to monitor pathway erosion on site. The Scottish Ten project collected airborne LiDAR data in addition to ground-based 3D laser scans, which are currently being examined by Orkney College in association with geophysical data to potentially identify previously unknown archaeological sites. Image © Centre for Digital Documentation and Visualisation LLP.

**Funding:** Scottish Government

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### The Knowes of Trotty, Harray, Orkney



Figure 9 Knowes of Trotty early Neolithic House, looking south. Image © Frank Bradford

The early Neolithic house at the Knowes of Trotty barrow cemetery in the parish of Harray, HY342174, was discovered through geophysical survey conducted over the barrow cemetery in 2001 when a discrete sub-circular area of high magnetic response was identified in the north east part of the Bronze Age barrow cemetery. The geophysical survey had the aim of locating features associated with Bronze Age burial rites, and the finding of an early Neolithic house was unexpected. Excavation of the house from 2002-2006 revealed a house layout similar to the Knap of Howar, with the occupation of the building spanning c. 500 years from approximately 3500-3000 BC.

**Funding:** Historic Scotland

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**Smerquoy, Wideford Hill, St Ola, Orkney**



Figure 10 The early Neolithic stone house revealed in Trench 1 at Smerquoy, St Ola. Image © Christopher Gee

The house lies near the base of the western slopes of Wideford Hill, St Ola, Orkney at HY403114. It is divided into two main compartments by opposing orthostats at the wall pinches. The northern compartment is dominated by a system of water channels and pits. The house has two entrances, one in the north end and a second at the northern end of the western wall which leads through a doorway once framed with stone jambs onto a paved area and possibly into a second building, as at the Knap of Howar. In the southern compartment there is a stone set square hearth and to its north a scoop hearth sealed under redeposited clay. Pits and stake holes in the southern end surround an area of burning on the clay floor. A stone forming the lowest course inside the northern entrance was peck decorated with two horned spiral designs, and may be the first decorated stonework from an early Neolithic domestic context.

**Funding:** Many private individuals and Orkney Archaeology Society

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### Links of Noltland, Westray, Orkney



Figure 11 Structure 18 at Links of Noltland.  
Image © Historic Scotland



Figure 12 Cattle skulls Structure 9 © Historic Scotland

Figure 11: This semi-subterranean Late Neolithic structure was built into a sand dune and survives almost to full original height. It represents one of over 20 prehistoric structures so far identified in severely eroding coastal machair on the north coast of Westray, HY428493. The extensive archaeological landscape, which also includes cemeteries, farming remains, middens, and outdoor butchery areas, covers an area of more than 42 hectares. The remains span the period from at least 3000 BC to c. 1000 BC. The current programme of investigation, initiated and funded by Historic Scotland and undertaken by EASE Archaeology, combines rescue excavation within a framework of wider academic research together with practical landscape stabilisation measures.

Figure 12: EASE Archaeology team member Sean Rice excavating a foundation deposit beneath a Neolithic house (Structure 9) which comprised of some 30 interlocking cattle skulls. These are now the subject of specialist research, including an investigation of their genetic make-up. The excellent preservation of organic materials such as bone and shell at Links of Noltland is providing a rare opportunity to investigate human/animal interactions from farming and foraging to tool making and the use of bone as a building material; as here in Structure 9, it also affords insights into the role of animals in Neolithic cosmology.

**Funding:** Historic Scotland

**Support:** Westray Heritage Trust

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Artefacts can tell stories too – examples from stone tools and axes



Figure 13 Sculpted stone from Pool, Sanday. Image courtesy of University of Bradford

The Neolithic period in Orkney is particularly rich in stone working. Excavated sites often produce large assemblages with a wide range of tool types and other stone objects. Stone was flaked, chipped, pecked and ground to produce tools for butchering, food processing and craft working as well as ground stone axes and more complex sculptural objects. Recent syntheses of the prehistoric stone assemblages from the Northern Isles (Clarke 2006) and the stone axes from Orkney (Clarke 2011) have demonstrated changes in how the stone artefacts were used and deposited throughout the Neolithic period and between settlement and funerary sites.

In the earlier Neolithic there are differences between the sizes and shapes of axes from settlements and tombs. Axes are the only stone finds from tombs of this period as none of the stone tools so common at settlement sites have been found at contemporary tombs. In contrast stone tools are present in Late Neolithic tombs whilst significantly no axes have been found in these contexts. Instead axes are commonly found at settlement sites of this period and these together with the unusual sculpted objects from Late Neolithic Pool add to the emerging pattern of an about-turn in the location of ritual practices using stone objects at this period – a swapping over from tombs to occupation sites.

Contact: Ann Clarke [annclarke@btconnect.com](mailto:annclarke@btconnect.com)



Figure 14 Axes from Braes of Ha'breck. Image courtesy of ORCA



### Ness of Brodgar, Stenness, Orkney



Figure 15 Multi-cupped marked stone from Structure 10. Image © ORCA

Figure 15: This is one of over 600 examples of Neolithic art from the Ness. The assemblage includes both worked architectural stone and portable examples with lightly incised, deeply carved, ground, pecked and pick-dressed examples, many of which are in situ.

Figure 16: Excavations began at the Ness of Brodgar in 2005 and are ongoing. Although large this trench still represents less than 10% of the site. Within the trench five large structures have been fully revealed with several more disappearing out of the trench and others indicated in the geophysical survey results. All of the major structures are contained within a large walled enclosure.



Figure 16 View over main trench, looking towards the Stones of Stenness. Image © Adam Stanford Aerial-Cam Ltd

**NGR:** HY303128

**Funding:** Present and past supporters of the Ness of Brodgar excavations include Orkney Islands Council, Russell Trust, Robert Kiln Trust, Orkney Archaeology Society, Orkney Builders, Orkney Heritage Society, Hiscox, Historic Scotland, LEADER European Fund, Currie Brothers, Orkney College University of Highlands and Islands, the British Academy, the Royal Archaeological Institute, Visit Orkney and numerous individuals from around the world

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## PART 3

### 3.0 A Revised Research Strategy

#### 3.1 INTRODUCTION

- 3.1.1 The 2005 World Heritage Site Research Agenda highlighted the lengthy history of archaeological and related research in and around the WHS. It also provided a detailed Research Strategy for future research in the World Heritage area and the wider Orkney landscape. Whilst deliberately not prioritising individual projects the Strategy comprised a method by which priorities could be drawn up within an ethos of sustainability (Downes et al 2005, 131).
- 3.1.2 The recognition that research relating to the WHS would not always take place within the site resulted in the creation of four nested geographical frameworks into which research could be set, described above.
- 3.1.3 Since 2008 a new Buffer Zone and Sensitive Area for the WHS have been in place. These replace the Inner Buffer Zones around Maeshowe-Stenness-Brodgar and Skara Brae, and the Outer Buffer Zone which were all drawn on the basis of existing designations. The new Buffer Zone, based on a comprehensive Setting Project undertaken in 2008 by Atkins Ltd (Atkins 2008) comprising two areas, respects the visual setting of the WHS. A larger Sensitive Area is used to control large scale or tall developments which may adversely affect this setting (Management Plan 2008-13, 11-14). These changes have already informed some of the data gathering and research objectives of projects, and should be noted for the future. For example the changes are likely to affect research in regard to Setting and Values, and areas within which baseline data is being gathered.
- 3.1.4 Within the revised strategy the research topics have not therefore followed the geographical settings outlined above, but have been simplified generally on the basis of relevance to the HONO WHS. The WHS and its Buffer Zone sit within the broader spatial and temporal context of Orkney, which in turn sits within the Atlantic European context, and out into wider contexts again. Understanding the WHS necessarily requires a grasp of the connections/relationships outwith its own boundaries, as evidenced by the movement of materials and considerable scales and levels of activity within these wider contexts.

#### 3.2 AIMS OF THE REVISED RESEARCH STRATEGY

- 3.2.1 The revised Research Strategy is a product of *Neolithic Orkney 2000-2010 – A Symposium*, the 2005 Research Strategy Review (part 2) and work by OWHSRCC. Its overall aim can be expressed as:
- the promotion of research to add to knowledge of the HONO WHS, undertaken in a sustainable manner.*
- 3.2.2 The Research Strategy review has highlighted areas of research requiring further investigation and remaining gaps in knowledge. The following aims relate to these:
- Develop and integrate WHS related data sources, including an enhanced SMR for the WHS, Buffer Zone and Sensitive Area.
  - Improve research benefits, impacts and legacy.
  - Complete baseline data for monitoring.
  - Develop detailed understanding of environmental change and the relationship between environmental change and human agency and adaptation, via environment studies of, e.g. deglaciation, Holocene landscape history, woodland usage and management, faunal colonisation.



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- Develop improved methods of assessing, monitoring and preserving sites/historic environment in step with environmental and economic change.
- Improve understanding of the relevance of and integration of folklore and place name studies to include full histories of the WHS monuments, including their representation in literature, folklore and local history.
- Widen access to archaeology through collaborations and fostering new relationships with non-archaeological communities.
- Develop research infrastructure for data sharing and linking research communities.
- Work with the museum sector to develop artefact and museums research and display, and inventories of artefacts and ecofacts.
- Encourage innovative and flexible approaches to new circumstances and research avenues.
- Develop an agricultural history of the WHS looking at, e.g. drainage, soil and paleoenvironmental analyses and land boundaries.

### 3.3 RESEARCH AND METHODOLOGICAL OBJECTIVES

3.3.1 The following specific objectives in relation to research and methodology have also been identified and prioritised.

3.3.2 The objectives are prioritised as being of high/**red** or medium/**yellow** importance.

3.3.3 The numbering is a new sequence, specific to the Research Strategy 2013-2018, to distinguish the objectives and topics from those of the original Research Strategy, and it is followed through to the subsequent section on Research Topics.

- 201.** Make best use of existing resources, e.g. samples from previous excavation sites. In order for this to be possible there needs to be better access to existing archive catalogues and collections (museum-based and site-based).
- 202.** Develop techniques for re-examining old samples and establish the suitability of older collections for analyses so that potential information is not lost, e.g. loss of residues for lipid analysis on older collections of pottery.
- 203.** Consider sampling strategies during excavations, e.g. test pitting, which need consideration to make more effective use of fieldwork.
- 204.** Routinely carry out multi-elemental analyses of house floor deposits.
- 205.** Provide for DNA and isotope studies of human and animal remains and collect appropriate data in order to answer questions about human and animal origins.
- 206.** Establish new guidelines to ensure that artefacts can be examined for microwear and used for trace analysis, e.g. no scrubbing.
- 207.** Consider selecting pottery samples for thin-sectioning.
- 208.** Consider organics and their importance when planning and targeting investigations.
- 209.** Increase the knowledge and skills-base for the recording and conservation of incised and painted stone.

- 210.** Reconsider or excavate antiquarian excavations in order to ensure the maximum information can be obtained from such investigation.
- 211.** Explore the balance between preservation and excavation, future display and interpretation, which is necessary in relation to the complex built archaeology encountered.
- 212.** Carry out analyses of pre- and post-depositional taphonomic history for faunal assemblages.
- 213.** Develop guidelines for a programme of fieldwalking for the WHS and Buffer Zone and review how fieldwalking is employed as an archaeological technique, e.g. by re-walking periodically the same fields.
- 214.** Encourage coastal survey to be undertaken, ensuring complete cover of the Sensitive Area.
- 215.** Explore and implement methods of coastal protection at Skara Brae.
- 216.** Continue geophysical prospection at different levels of resolution and make use of new developments.
- 217.** Exploit LiDAR.
- 218.** Adopt Historical Archaeology as a methodological priority when approaching research within the WHS and beyond.
- 219.** Consider how eroding and threatened sites can be used to answer archaeological and environmental research questions. They are an area for concern, but also a resource and consideration of the ways in which these sites can be used to answer research questions both archaeological and environmental should be made.
- 220.** Prepare and implement agreed strategies for identifying what coastal eroding sites need to be prioritised for action and which particular sites require regular recording and how.
- 221.** Identify the best methodologies for extracting maximum information in the shortest time from sites threatened with destruction.
- 222.** Develop qualitative and quantitative criteria to measure perception, value and understanding in relationships between archaeology and the tourist. Visitor surveys of unstaffed sites are an important part of this.
- 223.** Develop strategies for monitoring value and perception to ascertain the impact, in a local, national and an international context, of the WHS. 'Valuing' is also a key aspect of prioritising sites for action, and should relate to both research, management and community value.
- 224.** Establish the hydrological status of Maeshowe and the long-term implications for its stability.
- 225.** Analyse and publish backlogged research.
- 226.** Develop effective communication and dissemination between all those bodies and organisations managing and researching the sites and monuments which comprise the WHS, Buffer Zone and Sensitive Area, or which contribute to understandings of the WHS, e.g. the use of an interactive website.

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### 3.4 NEOLITHIC RESEARCH

- 3.4.1 The outcomes of *Neolithic Orkney 2000-2010 – A Symposium* (see below), subsequent meetings of the OWHSRCC and the review of the 2005 Research Strategy (part 2) form the basis of the revised Research Strategy set out in this document (part 3).
- 3.4.2 *Neolithic Orkney 2000-2010 – A Symposium* was held in November 2010, organised by the OWHSRCC, Historic Scotland and Orkney College UHI Archaeology Department. The symposium brought together those undertaking research over the past decade focused on the Neolithic in Orkney with specialists and interested parties from across the UK (Appendix F programme and participants).
- 3.4.3 As well as being an opportunity to share results of recent research, by focussing discussion on priorities and a strategy for future research primarily relating to the Neolithic, the symposium informed and formed part of the review of the 2005 HONO WHS Research Agenda.
- 3.4.4 This Neolithic-focussed section of the revised Research Strategy has been divided into themes which follow those used by the Neolithic panel of the Scottish Archaeological Research Framework (ScARF) (Brophy and Sheridan 2012). The alignment of the HONO WHS revised Research Strategy and ScARF serves both to highlight shared Scotland-wide research objectives and to identify areas where Orkney can answer particular issues raised in the ScARF Neolithic Panel report thus placing the HONO WHS in a wider Scottish context.
- 3.4.5 The themes set out below are as ScARF apart from the theme of *Landscapes, Environment and Climate* which has been elevated to a section on its own due to the importance of climate change to Orkney's archaeological resource.
- 3.4.6 The broad aims of Neolithic-focussed research are to:
- enhance understanding of Neolithic and earlier populations (human, animal and plants).
  - improve analysis of Neolithic material culture and understanding of material sources.

As is fundamental to the 2005 Research Agenda, existing collections of materials and the excavation of sites outside the WHS play an important role in increasing our understanding of the HONO WHS.

Research topics are listed within the themes below; these have been prioritised as high or medium importance and are numbered in accordance with 3.3.2.

## Themes

### *The Overall Picture (Orkney in Context)*

3.4.7 There is a need to better understand the big questions of Orkney's Neolithic; for example the origins of the people, domesticates and the farming lifestyle, and the Mesolithic/Neolithic transition. The subsequent flourishing of monumentality and cultural expression, and the impact of Orkney upon other places, particularly as evidenced by the phenomenon of Grooved Ware, must be a priority.

- 227.** The what, when, why and how of the Orkney Neolithic including the origins of the people, domesticates and farming practice, and the pre HONO context of both the Mesolithic and Mesolithic/Neolithic transition.
- 228.** Understanding the Mesolithic to Neolithic transition in the context of human relationships.
- 229.** Monumentality: a greater understanding of diversity in Neolithic architecture.
- 230.** Grooved Ware pottery: explaining the phenomenon, its meaning and when it started and ended.
- 231.** Explaining the passing of Orkney's Late Neolithic flourish.

### *The Detailed Picture – Regional and Chronological*

3.4.8 There is also a need for focus on the detail, both regional and chronological, which have scope to impact greatly on our understanding of Neolithic Orkney. This, combined with the overall themes above, leads into the specific sub-themes that have been grouped under *Lifeways and Lifestyles, Landscapes, Environment and Climate, Material Culture and Identity, Society and Belief*.

- 232.** Neolithic population size, density and distribution.
- 233.** The impacts and chronologies of environmental change over time including the processes taking place towards the end of the Neolithic and into Bronze Age Orkney.
- 234.** Wider geographical connections in the Neolithic, for example the relationship between Wessex and Orkney.

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### *Lifeways and Lifestyles*

#### **Ways of Living**

- 235. Land use: methods of cultivation and maintaining soil fertility.
- 236. Was the practice of middening an Orkney-specific adaptation?
- 237. The origins and chronologies of domesticates.
- 238. The origins, chronologies and use of 'wild' animals, e.g. deer, voles.
- 239. Investigations into the role and use of deer.
- 240. The human remains: how long people lived and how they lived; what illnesses they suffered; who they reproduced with, and the panoply of developing scientific techniques which can be brought to bear upon the evidence.

#### **Places to live**

- 241. House building – materials employed, methods of construction.
- 242. The creation and use of midden.
- 243. Was there a widespread timber phase of the Orcadian Neolithic?
- 244. The nature of house interiors, for instance the use of colour and furniture, what activities were carried out where.
- 245. Artefact distribution and spatial analyses in order to identify activities and possible patterning in the use of houses and settlements.
- 246. The roofing of houses at Skara Brae and elsewhere, e.g. look at the Ness of Brodgar evidence for stone flag tiles.
- 247. GIS and other research related to the factors behind settlement location.
- 248. Fuel use: what was used for fuel and how did it change through time?
- 249. The mobility of humans – both within the archipelago and further afield.

#### **Food and drink**

- 250. The nature of diet and whether diet varied across social groups/over time (both individual lifetimes and on a long time scale)?

### *Landscapes, Environment and Climate*

- 251. The landscape and how it changed from the start of the life of the sites.
- 252. Sea levels and how they changed.
- 253. Nature and impact of catastrophic events, e.g. tsunamis, storm surges, sand inundation.
- 254. Investigation of the date and nature of the deglaciation of Orkney.
- 255. Examine environmental change both inside and outside of the WHS, e.g. by coring.
- 256. Use of and changes in local woodland.
- 257. Astroarchaeological significance of the WHS.



*Material Culture*

3.4.9

- 258.** What was the purpose of carved stone balls?
- 259.** What was the significance of polished stone axes to Neolithic Orcadians?
- 260.** The provenance and identification of non-local lithic resources.
- 261.** Provenance and extraction of the stone used in the monuments.
- 262.** How stone was worked – from methods of quarrying to methods of decoration.
- 263.** Function of specific objects, e.g. Skaill knives.
- 264.** The significance of Grooved Ware and Beaker pottery in Orkney.
- 265.** The use of mineral based pigments, e.g. ochre, haematite.

*Identity, Society and Belief*

3.4.10

- 266.** How the ceremonial landscape of the WHS developed, how the sites relate to one another and to the wider world.
- 267.** Consideration of the representative nature of the datasets from chambered tombs.
- 268.** Standing stones: were/are there more? Where they came from and where they went.
- 269.** Nature and function of the Ring of Bookan?
- 270.** The nature and role of the Ness of Brodgar and how it articulates (separated from/ linked) with other sites – monumental, ceremonial and domestic.
- 271.** What were funerary practices and how did they change?
- 272.** How people dealt with the dead.
- 273.** How artefacts, e.g. maceheads, were used and deposited.
- 274.** Whether there was totemic use of animals.
- 275.** Conceptual approaches to animals – wild and domesticated, including birds, fish, etc.

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### 3.5 PRIORITISATION OF RESEARCH

- 3.5.1 The HONO WHS Research Agenda 2005 set out a mechanism (Downes et al, 2005, 132 -133) which allowed topics for research to be assessed and prioritised on a project by project basis, firstly against the principles for sustainable research set out in the HONO WHS Research Agenda 2005 (ibid, 120-121) and then against a table which allowed other elements to be factored in.
- 3.5.2 The principles for sustainable research as set down in 2005 have not changed and any project should be measured against these principles. They are:
- research aims should include the conservation of the WHS for the benefit and enjoyment of present and future generations
  - research should recognise that the resource is irreplaceable and seek to ensure that all aspects of its practice are as sustainable as possible
  - a general presumption in favour of preservation. Intervention should be the last resource, after all other avenues of research have been explored, and then it should be minimal
  - the precautionary principle should apply; unless it is possible to assess the impact of any interventions or other actions on the cultural and natural heritage resource, including that which is *not* to be disturbed, then potentially damaging actions should be avoided
  - in the case of invasive work, arrangements should be made for long-term monitoring of the condition of the site once works have been completed, in order, to understand better the consequences of such intervention and feed this knowledge into future strategies
  - as in all aspects of archaeological work, the highest standards must apply, not least with regard to recording, ensuring that there are proper records before, during and after work
  - parties should work together to share knowledge and resources, find solutions to common questions or problems, and maximise benefits, not least by ensuring that research objectives address the broadest possible spectrum of interests, including those of heritage managers
  - addressing back-logged research must be a priority in order to make all available information widely accessible
  - those undertaking research, particularly in the case of excavation, must have the highest quality knowledge, skills, technologies and resources available to them. All periods of human activity should be valid subjects for research, not just the main periods of the monuments in the WHS
  - investigation should, where possible, contribute to the understanding of the broader environment and the impact of human actions on natural resources through time
  - appropriate measures should be taken to assist all people, particularly the local community and tourists, to enjoy, appreciate, learn from and understand the WHS
  - all research should aim not only to address the specific requirements of the WHS and its environs, but to constitute examples of best practice with wider applicability.
- 3.5.3 The table against which any project should be scored has been amended to expand the criteria against which measurement should be made. As previously, it is not intended as dogma but as a guide for those working on the development of research projects, and also for those who fund them.

TABLE FOR PRIORITISING RESEARCH		
Climate and Environmental Change	Range of Options	Score 1 -10
Timescale of loss of information	Slow/chronic → rapid/catastrophic	
Extent of loss of information	Slight → total	
Amount of damage anticipated if no action taken	Very little → total destruction	
<b>Opportunities</b>		
<i>Management Opportunities</i>		
Securing preservation for some time	Less than 10 years → perceived as permanent	
Methodological application	Limited → wider	
<i>Importance of site/landscape</i>		
Scale of importance	Very local → international	
<b>Funding Source, local and international</b>		
Type	Partial → total	
Value for money	poor → good	
<b>Educational opportunities and community access</b>		
Academic quality	Poor → excellent	
Academic publication	Local → international	
Range of inclusion	Community excluded → community participation	
Increasing and widening engagement	Narrow → wide	
Applicability to WHS interpretation	Poor → good	
Range of dissemination	Narrow → wide	
Legacy	None → enduring	
<b>Developing understanding</b> (range and depth of applicability)		
Theoretical approaches	Poor → good	
Methodological development	Poor → good	
Conservation issues and techniques	Poor → good	
<b>Sustainable development</b>		
Benefits to economy	Low → high	

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3.5.4 Update, review and innovation are all vital to the sustainability and vigour of research. Furthermore, and since the production of the 2005 Research Agenda, the economic downturn and environmental change have changed the factors pertinent to the prioritisation of research objectives. Current factors include:

- economic impact
- climate change
- sustainable development
- contribution to research infrastructure/data sharing
- innovation
- flexibility to new circumstances.

3.5.5 This Research Strategy review forms a necessary step in the continued monitoring, promotion and coordination of research into the Heart of Neolithic Orkney World Heritage Site and the wider Orkney landscape, in the Neolithic and in other periods both prehistoric and historic. In addition it is hoped that the updated bibliography, project list and catalogue of current research formulated as part of the process of evaluating the 2005 Research Strategy will serve as a key reference for those engaged in new and ongoing research connected to HONO WHS. Finally, as with the 2005 Heart of Neolithic Orkney World Heritage Site Research Agenda, this is not intended as a static document or as the end point of what is naturally an iterative process. Rather it seeks to serve as a flexible framework and guide for ongoing and future research, and will be subject to periodic reviews to ensure its continuing relevancy and currency.

### Palynological analysis of small wetland basins across Orkney



Figure 17 Blows Moss. Image © M J Bunting

**Blows Moss, South Ronaldsay & Burray, Orkney** is a large elongate basin mire which currently supports fen vegetation. Palaeoecological analysis of a core from the site showed that the extensive birch-hazel woodland that was present in the surrounding landscape from c. 7400 cal. BC had already undergone a major decline at c. 5390 cal. BC. Arboreal pollen percentages of around 30% indicate that some woodland was still present at the start of the Neolithic, although this declined further at c. 3610 cal. BC. The cause of this second episode of woodland loss appears to have been primarily anthropogenic, although hydrological changes at the site may also have contributed.

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**Funders:** University of Hull, NERC

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**Whaness Burn, Hoy & Graemsay, Orkney.** Pollen analysis of a core from a small valley mire at the head of Whaness Burn on Hoy revealed possible evidence for the local presence of *Pinus sylvestris* (Scots pine) woodland during the later Neolithic. The presence of pine pollen in Orcadian pollen diagrams is usually interpreted as representing long-distance transport from the Scottish mainland, but in this case pine pollen values of 20-30% are taken as evidence for the local growth of this species at Whaness Burn in the late Neolithic. The decline of this woodland in the early Bronze Age was apparently caused by climatic deterioration, perhaps in combination with deliberate clearance by people (Farrell 2009; Farrell et al in press).

**NGR:** HY2457501043

**Funders:** University of Hull, NERC

**Contacts:** Jane Bunting and Michelle Farrell [m.farrell@hull.ac.uk](mailto:m.farrell@hull.ac.uk)

**Hobbister, Orphir, Orkney** is an extensive area of blanket peat in Orphir from which two cores were recovered for palaeoecological analysis. The two sequences show different dates for woodland decline and this is interpreted as reflecting the survival of a substantial stand of woodland close to the second coring point which was not detected at the first. The apparent loss of this woodland in the late Neolithic is associated with several indicators of anthropogenic activity, suggesting that the cause was largely either deliberate clearance or the introduction of grazing animals which would have inhibited natural regeneration. The palaeoecological records from Hobbister serve to demonstrate the problems associated with detection by pollen records of small stands of woodland in a predominantly open landscape, indicating that the extent of Orcadian woodland in later prehistory may have been substantially underestimated.

**NGR:** HY398065

**Funders:** University of Hull, Historic Scotland, Quaternary Research Association

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Figure 18 Wyre Mire. Image © M J Bunting

**Wyre Mire and Braes of Ha'Breck Rousay & Egilsay, with Wyre Orkney.** Preliminary pollen analysis of samples from a variety of contexts at the early Neolithic site of Braes of Ha'Breck is ongoing, although to date several samples have been found to contain interpretable pollen assemblages which, with further analysis, should provide information relating to both the occupation of the site and the vegetation and land-use of the surrounding area. A sequence recovered from Wyre Mire, a small basin mire approximately 250m to the east of Braes of Ha'Breck, appears to contain an intact palaeoecological record covering the period from the lateglacial to the early Iron Age. Lateglacial palaeoenvironmental information is rare from Orkney, and the sequence provides further evidence for mid-Holocene woodland diversity and late survival of woodland fragments as discussed by Farrell *et al.* The sequence also has the potential to shed light on human activity and land-use at the time Braes of Ha'Breck was occupied.

**NGRs:** Wyre Mire HY4420026200 Braes of Ha'Breck HY4374025933

**Funders:** University of Hull

**Contacts:** Jane Bunting, Daniel Lee, Antonia Thomas and Michelle Farrell [m.farrell@hull.ac.uk](mailto:m.farrell@hull.ac.uk)

### RCAHMS aerial reconnaissance

In 2004/5 the appreciation of the value of aerial recording on Orkney was limited to views of major monuments and military archaeology. Since then aerial reconnaissance by RCAHMS has demonstrated the potential for the recording of plough-levelled sites as differential cropmarking and revealing sites in shallow water, while an increasing emphasis on landscape approaches and survey has helped to establish the importance of the block coverage historical vertical imagery.

Aerial views of well-known ancient monuments and landscapes such as the Ring of Brodgar below, are popular though they also support understanding of changing condition and land use, factors that can be material considerations in managing and further understanding sites and their landscape context.



Figure 19 Ring of Brodgar. Image © RCAHMS



Figure 20 Overbigging. Image © RCAHMS

The potential of Orkney's arable crops to produce archaeological cropmarking was demonstrated in 1965 when St Joseph recorded the enclosure at Overbigging, near Maeshowe, but it was not until aerial reconnaissance in August 2009 generated a respectable return of previously unknown plough-levelled sites that this was placed on a systematic basis.



Figure 21 Wasbister. Image © RCAHMS



Figure 22 Mill Bay, Hoy. Image © RCAHMS

Aerial reconnaissance by RCAHMS of unimproved and pasture areas with low oblique lighting has contributed to the recognition of surprisingly extensive relict landscapes, adding to sites explored on the ground such as the field plots and other earthworks at Wasbister, north of the Ring of Brodgar, and leading to the recognition of previously unrecorded earthwork sites.

The value of the aerial perspective in shallow water was demonstrated when features recorded from the air in Mill Bay on Hoy led to ground visits and the identification of a layer of peat beneath the sands, undoubted evidence of a submerged landscape.

**NGRs:** Ring of Brodgar HY29451335 Overbigging HY28901367 Wasbister HY3152713173 Mill Bay ND3025995245

**Contact:** Dave Cowley [dave.cowley@rcahms.gov.uk](mailto:dave.cowley@rcahms.gov.uk)

### Rising Tide: Submerged Landscape and Archaeology of Orkney

Work on Holocene sea-level change around Orkney indicates that relative sea-levels only reached their present position some 4000 years ago.

The Rising Tide project was set up in 2005 with two aims:

1. To construct a sea-level curve to provide detail of former changes in relative sea-level around Orkney and to reconstruct the changing landscape through the Holocene.
2. To investigate the possibility that remains of past human settlement might be preserved on the seabed.

To this end the project combines various different strands of work including sediment coring, remote sensing, seismic survey, diving, inter-tidal survey, palaeo-environmental analysis on land, in the inter-tidal zone and from submerged surfaces, aerial photography, archive searches, and ethno-archaeology.



Figure 23 Orkney Landscape Reconstruction c. 8000BP (Early Mesolithic) with known Mesolithic sites as of July 2013. © Rising Tide Project



Figure 24 Orkney Landscape Reconstruction late Mesolithic with known Mesolithic sites as of July 2013. © Rising Tide Project



Figure 25 Diving work, Rising Tide project. Image © Rising Tide Project

**Funders:** Historic Scotland, Heritage Lottery Fund, Crown Estates, Leverhulme Trust, Carnegie Trust, NGS/Waite Grant, Private Funders, RCAHMS, Orkney Archaeology Society, Orkney Islands Council, Orkney Library and Archive, Orkney International Science Festival, Royal Archaeological Institute, Russell Trust, Universities of Aberdeen, Bangor, Dundee, St Andrews and Wales

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### The reconstruction of environmental change at the Ring of Brodgar, Mill Bay, Stronsay and the wider landscape of Orkney

The 2008 excavations of two trenches across the Ring of Brodgar ditch allowed pollen samples to be taken to reconstruct the past vegetation. The sediment infill within Trench C provided a limited picture of an open landscape. However, the more waterlogged northern Trench A provided better preserved microfossils and a higher resolution sequence (Figure below). The vegetation history of the isthmus around the Ring of Brodgar suggests the stone circle was erected and the surrounding ditch dug in an open grassland landscape where cattle and sheep grazed, cereal agriculture was minimal and probably limited to small plots around settlements. The open landscape would have ensured the high visibility of the Ring of Brodgar from the surrounding Neolithic landscape.

The palaeoenvironmental reconstruction of the site of occupation at Mill Bay, Stronsay provided tentative evidence of a tree/shrub covered landscape in the early Holocene prior to clearance during the Neolithic. The record of wind-blown sand provided an insight onto continuous land-use despite periods of storminess.

The reconstruction of the Neolithic Orkney landscape is being continued through a multi-proxy project (pollen, chironomidae, geochemistry, <sup>14</sup>C dating and tephrochronology) from loch sediment cores from Sabiston Water and Peerie Water, Orkney Mainland. It is anticipated that these cores will provide high-resolution records of Holocene environmental change with particular focus on the nature and timing of phases of transition.



Figure 26 Trench A, Ring of Brodgar. Image © Mary McCulloch

**NGRs:** Ring of Brodgar HY29451335 Mill Bay, Stronsay HY65502570 Sabiston Water HY2923722224 & Peerie Water HY3362227190

**Funders:** Ring of Brodgar: funded by Historic Scotland (through ORCA);  
Mill Bay, Stronsay: funded by Historic Scotland (through ORCA);  
Loch Sabiston: funded by University of Stirling

**Contacts:** Dr Eileen Tisdall and Dr Robert McCulloch [robert.mcculloch@stir.ac.uk](mailto:robert.mcculloch@stir.ac.uk)



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### 3.7 LIST OF ABBREVIATIONS AND ACRONYMS

HONO	Heart of Neolithic Orkney
HS	Historic Scotland
IBZ	Inner Buffer Zone
LIDAR	Light Detection and Ranging
NESTA	National Endowment for Science, Technology and the Arts
NLS	National Library of Scotland
OCGU	Orkney College Geophysical Unit
ORCA	Orkney Research Centre for Archaeology
OWHSRCC	Orkney World Heritage Site Research Core Committee
RCAHMS	Royal Commission on the Ancient and Historical Monuments of Scotland
RSE	Royal Society of Edinburgh
ScARF	Scottish Archaeological Research Framework
SMR	Sites and Monuments Record
UHI	University of the Highlands and Islands
WHS	World Heritage Site



# PART 4

## Appendices

### APPENDIX A – EVALUATION OF THE 2005 RESEARCH AGENDA SAMPLE RESEARCH TOPICS

The 31 Sample Research Topics in the 2005 Research Strategy are listed below and the status **at May 2012** of each project is given in the second column. This appendix complements part 2 of this review which evaluates the research themes outlined in the 2005 Research Strategy.

Sample Research Topic	Status
<b>Artefacts, monuments and cultural identity</b>	
1. Archival assessment and synthesis	<i>Ongoing: Orkney Museum and Orkney Archive are working towards creating a joint online catalogue. Also, ongoing cataloguing and artefact-photography programme at Orkney museum. A wider assessment and synthesis of museum-based material, artefacts and ecofacts, is yet to be undertaken.</i>
2. Architectural life histories	<i>Henges (Dye 2009). Neolithic influence on Iron Age in Rousay (Enlander 2008). Pool in Sanday (Hunter 2007).</i>
3. The creation of the monuments	<i>Megalithic construction (Kainz 2007).</i>
4. The life histories of artefacts	<i>Several student artefact-led studies and publications (Clark 2006; Cruikshanks 2010; Montesanti 2010; Somerville 2010).</i>
5. Review and strategy for detailed physical and chemical studies of artefacts	<i>The recently implemented and ongoing cataloguing programme at Orkney museum will increase knowledge of artefact type and location.</i>
6. Residue analysis	<i>Jones 2005 and Jones et al 2005.</i>
7. Period-specific research on social identity	<i>Viking-Scottish identity (Lange 2006, 2007a, 2007b). Iron Age identity (Carruthers current PhD research). Neolithic identities (Jones 2004). Maritime Societies of the Viking and Medieval World Conference (Gibbon 2008).</i>
8. Typological reviews	<i>Stone tools (Clarke 2006). Pottery (Cassidy 2009; Mason 2011).</i>
9. Experimental archaeology	<i>Pottery (Appleby 2006; Harrison 2007 and 2008). Also, of relevance Barber's experimental archaeology in Caithness (Barber 2009). Brewing (Dineley and Dineley 2010; Dineley 2011).</i>
10. Landscape Survey	<i>This topic has been covered extensively (Butler 2004; Card, Cluett, Downes, Gater and Ovenden 2007; Card, Downes, Gibson and Ovenden 2007; Card, Gater, Gaffney and Wood 2007; Lee, J 2007 and 2009; Lee, D 2008a; Leonard 2011; Marshall 2008; Moore forthcoming and current PhD research; Moore and Thomas 2008; Phillips 2004; Robertson 2005; Wickham-Jones, Dawson and Bates 2009). Also, Birsay-Skaill Landscape Project, Hoy and South Walls Landscape Project, Scapa Flow Landscape Partnership Scheme, Rising Tide Project.</i>
11. Boundaries	<i>Parish boundaries (Gibbon 2006); current Ness of Brodgar excavations.</i>
12. Astroarchaeological meanings	<i>Not done.</i>
13. Visitor surveys	<i>Not done.</i>

14. Contemporary experience	McClanahan 2004, 2006a and 2006b. Timoney 2009.
15. The role of archaeology in education in Orkney	Ongoing: Sustainability, past, present and future ESD and the HE curriculum (Mainland et al 2011; Downes et al 2010). Also, Orkney Gateway to the Atlantic project includes education and archaeology and the topic featured at Sustainability and Heritage Conference (Orkney College University of the Highlands and Islands 2012).
16. Local history	Not done.
17. Literary research	Not done.
18. Folkloric research	Not done.
19. Visual representations and the perception of landscape	Ongoing: A Thomas PhD research. Orkney World Heritage Sites artist residency – Symbols in a Landscape Project (Hammond 2012). Also, Keir 2010 MA dissertation on artwork at the Ness of Brodgar and A Thomas Monumental Visions project 2009.
20. Place-name research	Ongoing: NESTA Make It Local Project
<b>The formation and utilisation of the landscape</b>	
21. Soil formation	Ongoing: Rising Tide Project.
22. Modelling of landscape changes over time	Ongoing: Rising Tide Project, Birsay-Skaill Landscape Project. Also relevant for Aeolian deposition are Ashmore and Griffiths 2011; Dockrill 2007; Somerville et al 2007.
23. Monument formation processes	Research of soil conditions (Cluett 2007; Jones et al 2010; McKenna current PhD research; Simpson 2012; Simpson et al 2005 and 2006).
24. Agricultural and social landscape formation processes	Barnhouse and Skara Brae (Richards 2005a; Simpson et al 2006); Links House, Stronsay (Simpson 2012).
25. A comprehensive programme of dating	Although there is no current research project focussing on this topic ORAU and NMS re-dating programmes and new dating results from recent and current excavations will provide additional data for the chronological framework.
26. Existing bioarchaeological data	Ongoing: environmental data from Howe of Howe excavations has recently been catalogued by Orkney Museum as part of a Scapa Flow Landscape Partnership Scheme project. Also, environmental data from Bu Broch has been catalogued and all environmental data held by Orkney Museums will soon be housed in one building.
27. Further excavation	Ongoing: bioarchaeological data has been gathered from recent major excavations, including Ness of Brodgar, Braes of Ha' Breck, The Cairns in South Ronaldsay and Links of Noltland.
28. Modelling climate change	Ongoing: Rising Tide Project within WHS BZs. Outwith WHS BZs paelaeoenvironmental research (Bunting and Farrell 2010; Farrell 2009; Farrell and Bunting 2007, 2008a, 2008b, 2008c and 2009).

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29. Initial post-glacial colonisation of Orkney	<i>Ongoing: Rising Tide Project. Coastal environmental changes (De la Vega-Leinert et al 2007); Late-Holocene environmental changes (Potts current PhD research).</i>
30. Use of plants, especially cultivated plants, in prehistoric Orkney	<i>Ongoing: WHS and IBZ (King 2005, Hinton 2005); other Orkney sites (Richards and Fuller et al 2006; Balasse et al 2009; Barrett et al 2004, Barrett et al 2011; Bishop current PhD research; Budd current PhD research; Schulting et al 2010; Upex 2009, Upex et al 2012.</i>
31. Non-economic values and activities apparent in bioarchaeological evidence	<i>Ongoing: Cooke current PhD research. Also, Webster 2010.</i>

## APPENDIX B – EVALUATION OF THE 2005 RESEARCH AGENDA SAMPLE RESEARCH PROJECTS

The 91 Sample Projects in the 2005 Research Strategy are listed below and the status of each Project at **May 2012** is given in the second column. This appendix complements part 2 of this Review which evaluates the research themes outlined in the 2005 Research Strategy.

Sample Project	Status
<b>Artefacts, monuments and cultural identity: Site Specific</b>	
1. Refinement of the dating of the monuments of the WHS through the compilation of a comprehensive dating programme for the monuments and their surrounding landscape. New dates should include the use of a wide range of dating techniques.  In addition, a register of all dateable and dated material should be built, as well as a re-consideration of the taphonomy of all existing dates.	<i>Re-excavation of ditch at Ring of Brodgar to obtain material for a range of dating applications (Downes and Richards 2008; Downes, Richards and Thomas 2008). Stones of Stenness: ORAU re-dating programme (Sheridan and Higham, 2006). Skara Brae: NMS C14 dating programme (Sheridan et al 2009).</i>  <i>Not done.</i>
2. New excavation to establish the chronological position of important complexes of monuments, such as those at Ring of Brodgar and Maeshowe.	<i>Re-excavation of ditch at the Ring of Brodgar (Downes and Richards 2008; Downes, Richards and Thomas 2008); Maeshowe (Richards 2005a).</i>
3. A study of the mechanics of construction of the different monuments.	<i>Re-excavation of ditch at the Ring of Brodgar (Downes and Richards 2008; Downes, Richards and Thomas 2008); Maeshowe (Richards 2005a).</i>
4. Examination of the possible meanings attached to the actions of monument construction.	<i>See various chapters in Richards 2005a discussing Maeshowe, Ring of Brodgar and Stones of Stenness.</i>
5. A study of each monument to produce a history, not only of its construction but also of its alteration and use through time to the present day.	<i>Not done.</i>
6. Experimental studies relating to individual types of artefact, e.g. of the manufacture and use of pottery. This should include work on the source materials and could be extended to look at the relationships between different types of artefact, such as the sources used in pottery production and stone tool production.	<i>Grooved Ware from Skara Brae (Appleby 2006; Harrison 2007, 2008).</i>
7. Residue analyses to determine the function of various artefacts, such as pottery, bone or stone tools.	<i>Barnhouse Grooved Ware (Jones et al 2005).</i>
8. An examination of the preparation for site construction relating to individual monuments: is there evidence of ground preparation and/or the use of introduced materials to create a platform? If materials were imported to the site, what is their nature and origin?	<i>Excavation of the ditch at the Ring of Brodgar (Downes and Richards 2008; Downes, Richards and Thomas 2008); Maeshowe (Richards 2005a).</i>

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9. Maeshowe: examination of the complex construction of the core cairn. What role did its revetting walls play during natural consolidation of mound material and thus shrinkage after construction, and how did this relate to the built walls of the chamber? Was the choice of mound material made with consolidation in mind?	<i>Maeshowe (Richards2005a).</i>
10. Maeshowe: what is the hydrological status of the mound and how does that affect its long-term stability?	<i>Not done.</i>
11. Maeshowe: conventional geophysics is of limited value here but the mound would serve as a test-bed for GPR, electrical imaging and seismic study, while the base of the mound and platform would benefit from intensive survey.	<i>GPR survey at Maeshowe (OCGU IBZ survey).</i>
12. Skara Brae: analysis of the middens to examine their development, use and modification over time. Fuel residue analyses of midden deposits will be important both in identifying the original fuels and understanding the importation of material to the site.	<i>Not done, although there has been sediment analysis at Skara Brae (Simpson et al 2006).</i>
13. Skara Brae: functional analyses of the various occupation surfaces.	<i>Not done.</i>
14. Skara Brae: analyses of site taphonomy including the decomposition products of bone (calcium, iron and phosphate features), and of shell (calcium carbonate features), the use of turf or other materials for roofing, and the decomposition of stone.	<i>Not done.</i>
15. Examination of the impact of earlier excavation and conservation measures on the sites.	<i>Routine site maintenance and monitoring visitor erosion at HS sites (Historic Scotland 2008, 78). Maeshowe (Murray and Hollinrake 2006).</i>
16. Assessment of the impact of the introduction of new turf material and associated biological agents for the managed sites.	<i>Routine site maintenance at HS sites and ground maintenance regime at Brodgar (Historic Scotland 2008, 77 and 78).</i>
17. Assessment of the impact of the introduction of new stone material for managed sites.	<i>Routine site maintenance at HS sites (Historic Scotland 2008, 78).</i>
<b>Artefacts, monuments and cultural identity: WHS Specific</b>	
18. Compilation of an archive/synthesis of museum-held material relating to the WHS.	<i>Ongoing: Orkney Museum's cataloguing and artefact-photography programme. Work on collections outside Orkney not yet undertaken.</i>



19. Compilation of an updated inventory of historical, pictorial, oral history and cartographic sources relating to the WHS.	<i>In part: the bibliography update in appendix C adds to the extended bibliography of the Research Agenda. Also, ongoing cataloguing in the Orkney Archive, increased availability of cartographic sources on the NLS website and inclusion of Orkney's SMR in CANMORE mean that although there is no inventory the information is easier to obtain.</i>
20. Compilation of a database of photographs relating to the monuments of the WHS. This should contain information on current locations and be suitable for annual updating.	<i>Although a specific database has not been compiled, the increased number of digital photographs available of WHS in CANMORE and the cataloguing of the Orkney Archive photographs provide useful resources.</i>
21. New excavation to establish the chronological position of important complexes of monuments related to the WHS, such as the site at Bookan.	<i>Excavation at Bookan (Card 2005) and Ness of Brodgar (Card 2004, 2005, 2006, 2007b, 2010a, 2010b; Card, Lee and Thomas 2009, 2010).</i>
22. Investigation of the importance of the WHS area to preceding non-farming groups.	<i>Rising Tide Project (Wickham-Jones and Towrie 2008).</i>
23. Exploratory geophysical survey of the WHS to locate new archaeological sites, using a combination of magnetic scanning and magnetic susceptibility sampling across detailed sample survey blocks.	<i>OCGU WHS IBZ survey. Ring of Brodgar (OCGU 2009b; 2011e).</i>
24. Survey by geophysics of specific sites related to the WHS area, such as 'Stenness Palace'.	<i>Ness of Brodgar (OCGU 2007a); Ring of Bookan (OCGU 2007m). IBZ survey (OCGU 2004c, 2005a, 2005b, 2006a, 2006f, 2006p, 2007a, 2008b, 2008h, 2011a).</i>
25. Construction of a detailed oral history of the WHS monuments in Orkney.	<i>Not done.</i>
26. Examination of the role of the monuments of the WHS in contemporary Orcadian society.	<i>Dye 2009; McClananhan 2004, 2006a and 2006b. Timoney 2009.</i>
27. Examination of the place-names of the WHS.	<i>Not done.</i>
28. The continuation of a fieldwalking programme to cover whole of the WHS.	<i>Not done.</i>
29. The evaluation of the results of fieldwalking.	<i>Not done.</i>
<b>Artefacts, monuments and cultural identity: Zone Specific</b>	
30. A programme of astro-archaeological research relating to the major monuments and their relationship with the surrounding land.	<i>Not done.</i>
31. Exploratory geophysical survey of the buffer zones to locate new archaeological sites, using a combination of magnetic scanning and magnetic susceptibility sampling across detailed sample survey blocks.	<i>OCGU Buffer Zone Survey (2004c; 2005a; 2005b; 2006a; 2006f; 2006p; 2008b; 2008h; 2011a).</i>

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32. All future developments with the wider zones should be preceded by appropriate geophysical investigation.	<i>OCGU Buffer Zone survey (2004c, 2005a, 2005b, 2006a, 2006f, 2006p, 2007a, 2008b, 2008h, 2011a).</i>
33. Systematic topographic survey of the setting of the WHS in order to record new sites and provide a wider landscape context to the monuments of the WHS.	<i>Ibid. Also, Birsay-Skaill Landscape Project (Griffiths 2003, 2004, 2005, 2007, 2008, 2009).</i>
34. Field survey along the coast adjacent to Skara Brae and along the shorelines of the Lochs of Harray and Stenness, as well as coastal survey within the OBZ, in order to record eroding sites.	<i>Birsay-Skaill Landscape project.</i>
35. The continuation of a fieldwalking programme to cover whole of the IBZ.	<i>Not done.</i>
36. The evaluation of the results of fieldwalking.	<i>Not done.</i>
37. Systematic underwater survey and evaluation of Harray and Stenness lochs, the results to be integrated with those of land-based survey.	<i>Ongoing: see The Rising Tide Project (Bates et al 2012).</i>
<b>Artefacts, monuments and cultural identity: Orkney Specific</b>	
38. The petrological and macroscopic examination of stone tools from Orkney, along with a contextual analysis.	<i>Clarke 2006, Saville 2004 and 2005.</i>
39. Analysis of the relationship between the sources of materials used for artefacts in Orkney and known sources further afield, such as the (Group XXII) axe production site at the Beorgs of Uyea on Mainland Shetland.	<i>Not done.</i>
40. A detailed study of the bone, antler and shell tools of Neolithic Orkney, to include information on manufacture, style, use and deposition.	<i>Not done.</i>
41. An examination of the social meaning of specific artefact styles.	<i>Jones, A 2004.</i>
42. An examination of the meaning and function of Beaker pottery in Orkney.	<i>Mason 2011.</i>
43. An examination of individual artefacts and monuments as period specific indicators of social identity.	<i>Jones, A 2004 and 2005.</i>
44. Intra- and inter-site studies of artefact manufacture, use and deposition.	<i>Iron production (Cruikshanks 2010); Pottery (Mason 2011).</i>
45. The examination of the use of natural pigments, such as haematite, in prehistoric Orkney using experimental and other techniques.	<i>Not done.</i>

46. Skeletal studies: Orkney holds an unparalleled skeletal record for some periods of prehistory and recent advances in techniques mean that this could be used to shed light on many different aspects of great relevance to the WHS, such as diet, illness, mobility and origins.	<i>Ongoing: Budd current PhD Research; Lawrence 2006, 2010 and ongoing PhD research.</i>
47. Investigation of the size of the population in Orkney through time, and the changing effects of population pressure.	<i>Not done.</i>
48. Investigation of the evidence for, and date of, the initial post-glacial settlement of Orkney.	<i>Wickham-Jones 2010; Woodward 2012.</i>
49. Investigation of the mobility and connections with the wider world among the first inhabitants of Orkney.	<i>Wickham-Jones 2010; Woodward 2007, 2008 and 2012.</i>
50. Investigation of the advent of farming and nature of transition from hunter gatherers in Orkney – what were the relationships between the two groups?	<i>Wickham-Jones 2010.</i>
51. Investigation of the nature of Bronze Age settlement in Orkney.	<i>Moore and Wilson 2011; Robertson 2005; Mamwell (current PhD research).</i>
52. Investigation of the nature, date and function of burnt mound sites in Orkney.	<i>Anthony 2003.</i>
53. Investigation of the nature, date and function of souterrains in Orkney.	<i>Carruthers current PhD research.</i>
54. Mapping and investigation of crannog sites in Orkney.	<i>Crowley 2008; Dixon and Forbes 2005; Laureanti 2012, Orkney College UHI. E Pollard investigations of Crannogs in Loch of Swanney.</i>
55. Investigation of archaeology as an educational tool in Orkney	<i>Ongoing: Things Project, international project including Orkney thing sites; site-based drama, education &amp; interpretation by pupils <a href="http://www.thingsites.com">www.thingsites.com</a>; ESD project: Archaeology in Education for Sustainable Development, I Mainland Orkney College UHI.</i>
56. Investigation of the influences of archaeology on literature in Orkney.	<i>Not done.</i>
57. Investigation of the influences of archaeology on art, both historical and modern, in Orkney.	<i>Ongoing: Thomas current PhD research.</i>
58. An evaluation of existing research into the place-names of Orkney.	<i>Ongoing: Julie Gibson NESTA Make It Local project.</i>
<b>The formation and utilisation of the landscape: Site Specific</b>	
59. An examination of the pre-monument landscape: soil conditions immediately before monument construction.	<i>Ongoing: Simpson HONO WHS Project.</i>

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60. An examination of the evidence for pre-monument construction activity: is there any evidence for activities prior to the construction of individual monuments, such as agriculture, funerary activity, the building of settlements, or the erection of stone settings?	<i>Relevant chapters in Richards 2005a.</i>
61. Skara Brae: an examination of the sequences of sand accumulation and soil formation.	<i>Simpson et al 2006.</i>
62. Skara Brae: Geophysics to assess the effects of coastal erosion by helping to define the extent of the site along the seashore and the limits inland.	<i>OCGU IBZ phases IX, X and XII (OCGU 2006f, 2006p, 2008b, 2011a).</i>
63. An examination of local drainage: what changes in local drainage are associated with monument construction, within and around individual sites? What role did the construction of drains play in alleviating the potentially negative impacts of new drainage regimes? What effects did new drainage regimes have on soil stability and bearing strength of soil?	<i>Not done.</i>
64. Compilation of an inventory of existing bio-archaeological data for the WHS.	<i>Not done.</i>
65. An examination of agricultural history within the WHS: were materials imported to create cultivation beds?	<i>Not done.</i>
66. Analyses of pre- and post-depositional taphonomic history for faunal assemblages in Neolithic cairns and settlement sites.	<i>Not done.</i>
<b>The formation and utilisation of the landscape: Zone Specific</b>	
67. Production of an agricultural history of the WHS and buffer zones through related techniques such as detailed soil analyses and palaeo-environmental analysis.	<i>Ongoing: Simpson HONO WHS Programme.</i>
68. Production of a detailed plan of land boundaries in and around the buffer zones and an examination of their construction, morphology, functions and meaning.	<i>Not done.</i>
<b>The formation and utilisation of the landscape: Orkney Specific</b>	

69. The construction of a detailed history of field management strategies in Orkney through hand-auger survey of known deep topsoil areas within West Mainland, in order to provide depth distributions of these cultural soils which can then be related to settlement sites. This should be combined with survey to identify new areas of deep topsoil.	<i>PhD thesis on soil and sediment-based cultural records and the WHS BZs (Cluett 2007).</i>
70. The location of buried, fossil, plaggen type soils of prehistoric age, as at Tofts Ness, Sanday could be undertaken and related to soil development in the WHS, for example in the wind-blown sand areas of Sandwick.	<i>Dockrill et al (2007). McKenna current PhD research on Links of Noltland.</i>
71. The recovery of palaeo-botanical data and an examination of the rôle of plants in prehistoric Orkney.	<i>Ongoing: Bishop current PhD research.</i>
72. Investigation of the date and nature of the deglaciation of Orkney.	<i>Not done.</i>
73. A programme of palaeo-environmental work across Orkney to investigate the environmental history of the Holocene.	<i>Not done.</i>
74. Investigation of sea-level change in Orkney through the Holocene, including information on submerged landscapes.	<i>Ongoing: Rising Tide Project.</i>
75. The survey of submerged areas to recover information on archaeological preservation.	<i>Ongoing: Rising Tide Project.</i>
76. Investigation of the faunal history of Orkney with reference to both wild and domestic species.	<i>Balasse et al 2009, Upex 2009, Upex et al 2012, Fraser current PhD research.</i>
77. Investigation of woodland usage and management during the Holocene.	<i>Not done.</i>
78. The colonisation of Orkney by its mammalian fauna, especially in relation to human migration.	<i>Not done.</i>
<b>Cross-theme: WHS Specific</b>	
79. The production of an enhanced SMR specific to the WHS. This should be on-line and designed for maximum public accessibility.	<i>Transfer of the Orkney SMR to RCAHMS where it can be consulted on their online database CANMORE.</i>
80. Compilation of a database of all existing geophysics work in the WHS. This should be held centrally and suitable for the addition of new work.	<i>See appendix D for example of the project database held by ORCA which includes all Geophysics work in the WHS. Also, see appendix C for latest bibliographical update.</i>



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81. Compilation of a database of aerial records relating to the WHS in particular.	<i>WHS included within the RCAHMS National Collection of Aerial Photography.</i>
82. The analysis and publication of backlogged research, particularly regarding unfinished excavation projects in the WHS.	<i>OIC and HS funding 2012 to publish geophysical survey around the WHS; HS funding for post-excavation of Tuquoy material.</i>
83. A season of concentrated aerial reconnaissance in Orkney targeting the WHS.	<i>RCAHMS Aerial Survey 2009 (Cowley 2010).</i>
<b>Cross-theme: Zone specific</b>	
84. Compilation of a GIS system relating to the WHS and the buffer zones to combine information on field survey, topographical history, monument location.	<i>Not done.</i>
85. Desk-based assessment of the archaeological value of the current aerial records, including both vertical and oblique photographs.	<i>Orkney from the Air: The aerial archaeology of Orkney (Leeming 2005).</i>
<b>Cross-theme: Orkney specific</b>	
86. Establish a research centre for archaeology in Orkney, under the auspices of an Archaeology Institute for the Highlands and Islands: to act as an umbrella organisation for research on the WHS.	<i>In part: Creation of ORCA, ORCA Marine and the continued developments in archaeological provision at undergraduate and postgraduate levels at Orkney College are all building towards this aim.</i>
87. Establishment of a post of community archaeologist.	<i>Temporary appointment of a LEADER funded Archaeology and sustainable development project officer, 2010 -2011.</i>  <i>Community Projects: Scapa Flow Landscape Partnership Scheme; Hoy &amp; South Walls Landscape Project; NESTA Make it Local Project.</i>
88. Compilation of a database of aerial records relating to Orkney in general.	<i>See RCAHMS National Collection of Aerial Photography Scotland Gallery.</i>
89. The analysis and publication of backlogged research, particularly regarding unfinished excavation projects in Orkney.	<i>Post- excavation and DSR for Bretta Ness, Rousay (Reay and Sharman, 2012); HS funding for post ex of Tuquoy, Westray material.</i>
90. Study of history of archaeological research on Iron Age onwards in Orkney.	<i>Not done.</i>
91. A review of existing evidence relating to the Late Neolithic – early Bronze Age in Orkney, together with targeted fieldwork/artefact-based research in order to investigate this poorly understood period.	<i>Masters Dissertation: Mason, O. 2011 Dialogues of Clay: Characterising Later Neolithic and Earlier Bronze Age Pottery.</i>  <i>Rinyo, Sourin valley project 2012 ongoing (J Downes, M Edmonds, I Mainland).</i>

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## APPENDIX D – TABLE OF ARCHAEOLOGICAL FIELDWORK UNDERTAKEN IN ORKNEY 2004-2012

PARISH AND SITE NAME	TYPE	PERIOD	FIELDWORK	GEOPHYS. NMRS No.	SMR No.	NGR	DIRECTOR	BIBLIOGRAPHIC REF.
Aviation Research Group Orkney and Shetland (ARGOS)	aviation heritage	20th century	data collection			various	Heath/Shearer	www.crashsiteorkney.com
Birsay, Buckquoy peninsula		Pictish/Norse	excavation	various	various	HY244282	D Griffiths Birsay-Skaill Landscape Archaeology Project	Griffiths, D 2005; 2006
Birsay, Quilco, Dounby	no archaeological remains were identified		watching brief	HY22SE 95		HY296211	Mamwell, C J	Mamwell 2007
Birsay, Brough of	settlement/monastery	Pictish/Norse	geophysical survey	YES	OR 1338	HY23972851	OCGU Birsay-Skaill Landscape Archaeology Project	Griffiths 2007a; OCGU 2008a
Birsay, Loch of Swannay	crannogs	Iron Age	marine survey	various	various		Pollard, E	
Birsay, Marwick Bay	settlement activity/potential archaeological anomalies		geophysical survey	YES	various	HY230241, HY230237	OCGU	Griffiths 2009; 2011; OCGU 2009c, 2009j, 2011b
Birsay, Marwick Bay	various	Prehistoric-20th century	walkover survey	YES	various	HY23052360	Sharman, P	Sharman 2009
Birsay, Midhouse	no archaeological remains were identified		watching brief			HY28732334	Lawrence, D	Lawrence 2008a
Birsay, Palace	unidentified archaeological deposits		watching brief/ test pits		OR 1664	HY248278	Lawrence, D	Lawrence 2009a, 2009c
Birsay-Skaill Landscape Archaeology Project	various	Multiperiod	survey/excavation	YES	various	HY244282	Griffiths, D	Griffiths 2007b, 2008, 2009, 2010

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PARISH AND SITE NAME	TYPE	PERIOD	FIELDWORK	GEOPHYS. NMRS No.	SMR No.	NGR	DIRECTOR	BIBLIOGRAPHIC REF.
Birsay-Skaill Landscape Archaeology Project	various	Multiperiod	geophysical survey	various	various	HY244282	OCGU/Griffiths, D	Griffiths 2007b; OCGU 2009e
Burray, Bu Sands	potential archaeological anomalies	Prehistoric-Medieval	evaluation/coring/geophysical/walkover survey	various	OR 02370	ND483978	Robertson, J & Sharman, P; OCGU OCGU/West, S	Robertson, J & Sharman, P; OCGU 2010q, 2011d; West 2010
Burray, East Broch of Burray	broch	Iron Age	survey	ND49NE1	OR 178	ND48989882	OCGU Moore, J	OCGU 2006f Moore 2006, 2007
Burray, Italian Chapel	chapel/military camp	20th century	recording	ND49NE43		ND47809813	Lynn, D	Lynn 2009b
Deerness, Brough of	ecclesiastical	Medieval	excavation	HY50NE 14	OR 1147	HY595087	Barrett, J	Barrett and Slater 2008a, 2008b, 2009; Barrett et al 2010; Gerrard and Barrett 2009
Deerness, Brough of	ecclesiastical	Medieval	geophysical survey	HY50NE 14	OR 1147	HY595087	OCGU	OCGU 2006d Ovenden 2008; Gerrard and Barrett 2009; OCGU 2009q; Barrett et al 2010
Deerness, Upper Stove	six mounds of uncertain origin	Prehistoric	walkover survey	various	various	HY58300740	Lynn, D	Lynn 2008
Birsay, Makerhouse, Dounby	possible pre 19th century building and enclosure/natural and modern responses		geophysical survey		OR 1712	HY29352114	OCGU/ORCA	OCGU 2007; Lawrence and Ovenden 2007
Birsay, Makerhouse, Dounby	no clearly defined archaeological anomalies		walkover survey/excavation			HY29252100	ORCA/OCGU	Hollinrake 2010a and 2010b
East Mainland, undisclosed	artefacts	Medieval	discovery				Gibson, J	Towrie 2011
Eday, Calf of	tomb/settlement	Prehistoric	geophysical survey			HY579386	OCGU	OCGU 2006i
Eday, Green	settlement	Neolithic	excavation	HY52NE 10	OR 2331	HY 5697128987	Miles, J M	Miles, J M 2007; OCGU 2006c Miles, J M 2008, 2009, 2010

PARISH AND SITE NAME	TYPE	PERIOD	FIELDWORK	GEOPHYS. NMRS No.	SMR No.	NGR	DIRECTOR	BIBLIOGRAPHIC REF.
Eday, Linkataing	roundhouse	Iron Age	survey/excavation	HY53NE 8	OR 750	HY 55303936	Sharman, P/ Robertson, J	Sharman and Robertson 2007
Eday, Stackelbrae	settlement/castle	Medieval	excavation	YES	OR 741	HY 56412884	OCGU; Brend, A	OCGU 2006b: Brend 2008a, 2008b, 2009a, 2009b
Evie, Woodwick Burn	various sites noted		field survey	various	various	HY 36602270	Lynn, D	Lynn, D 2007
Evie, Broch of Burgar	broch	Iron Age	geophysical survey	YES	OR 639	HY 35212771	Moore, J	Moore forthcoming b
Evie, Broch of Grugar	broch	Iron Age	geophysical survey	YES	OR 638	HY 35652730	Moore, J	Moore forthcoming a
Evie, Broch of Guiness	ridge and furrow cultivation		geophysical survey	YES	OR 1183	HY 381268	OCGU	OCGU 2007k, 2007n.
Evie, Broch of Guiness	no archaeological remains were identified		watching brief	YES	OR 1183	HY 381268	Hollinrake, A	Hollinrake 2007a, 2009c
Eymhallow Landscape Project	various	Multiperiod	geophysical survey/ walkover survey	YES	various	HY 360290	Moore, J/ Thomas, A	Moore and Thomas 2007, 2008a and 2008b.
Firth, Heddle Hill Quarry	no archaeological remains were identified		watching brief		OR 573	HY 355130	Lawrence, D	Lawrence 2007a, 2008d
Firth, Hillock Broch	possible ditch/ potential archaeological anomalies		geophysical survey	YES	SAM 1448	OR 492	OCGU	OCGU 2004a: OCGU 2007i
Firth, Hillock Broch	multiple ditches associated with Hillock Broch	Prehistoric	watching brief		OR 492	HY 36111415	Lawrence, D	Lawrence 2007c, 2008c
Firth, Muckquoy	flint scatter	Prehistoric	fieldwalking		HY 31 NE 13; HY 31 NE 40	HY 376174	Cantley, M; Moore, J & Carruthers, M 2006	Cantley, M 2005; Moore, J & Carruthers, M 2006
Firth, Redland Broch	?chambered cairn		geophysical survey	YES	OR 576	HY 37801715	OCGU	OCGU 2009g, 2009k, 2010e
Firth, Redland farm			survey			HY 370170	Lynn, D	Lynn, D 2004b

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Firth, Redland Farm	barrow cemetery/ post-medieval steading	Prehistoric -Post Medieval	survey	HY31 NE 11; HY31 NE39; HY31 NE 10	OR 568	HY36681703	Moore, J	Moore 2008	
Firth, Rising Tide Project	stone remains at 5 locations on seabed	Prehistoric	sub-sea survey/ landscape survey	HY31SE 73		HY387141	Wickham-Jones/ Dawson, S/ Bates, R	Wickham-Jones, Dawson and Bates 2009; Wickham-Jones et al 2010	
Firth, Rowandale	no clearly defined archaeological anomalies		geophysical survey	YES		HY364132	OCGU	OCGU 2010i and 2010l	
Firth, Stymilder	aviation crash site	WWII	survey/excavation			HY3387313427	ARGOS	Heath 2011b	
Harray, Caperhouse	souterrain	Prehistoric	geophysical survey	YES	OR 2895	HY314171	OCGU	OCGU 2004c	
Harray, Geroin	cist	Bronze Age	excavation	HY31NW 102	OR 2892	HY328751	Toolis, R	Toolis, R 2004	
Harray, Hindera Fiold	aviation crash site	WWII	survey/excavation			HY3417718842	ARGOS	Heath 2011a	
Harray, Knowes of Trotty	barrows	Bronze Age	excavation	YES	OR 1642	HY342174	Card, N/ Downes, J	Card, Downes, Robertson and Sharman 2005; 2006; 2007	
Harray, Midhouse, North Bigging	no archaeological remains were identified		watching brief			HY32SW 17	OR 1594	HY30752000	Lawrence 2008b, 2008e
Harray, Stoney Hill	?henge	Prehistoric	geophysical survey	YES	OR 2327	HY32211568	OCGU	OCGU 2009a	
Harray, Nessbreck	souterrain	Iron Age	excavation	YES		HY325190	Robertson, J	Robertson, J 2007	
Harray, Quilco	burnt mound	Bronze Age	geophysical survey	YES	OR 1717	HY295210	OCGU	OCGU 2006h	
Holm, Lamb Holm	various	Prehistoric-20th century	walkover survey	various	various	HY48300030	Sharman, P	Sharman 2010b, 2010c	
Hoy Heritage Project, Creels and Crofts	various		data collection				Marr, R	<a href="https://hoyheritage.wordpress.com/">https://hoyheritage.wordpress.com/</a>	
Hoy, Whaness Burn	palaeoenvironmental study	Prehistoric	palaeo- environmental			HY20SW 41	Farrell, M/ Bunting, J	Farrell and Bunting 2008a	

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Hoy, Binga Fea	various	various	walkover survey			ND298933	Card, N	West and Sharman 2011
Hoy, Quoy-Dale	no archaeological remains were identified		watching brief	HY20SW 40		HY23950357	Robertson, J	Robertson 2007f
Hoy and Graemsay			survey	various	various	HY260000	Robertson, J	Robertson, J 2006
Kirkwall & St Ola, Hillocks of Garth	no archaeological remains were identified		watching brief	HY40NE 5	OR 1523	HY46780780	Lawrence, D	Lawrence 2007b
Kirkwall and St Ola, Lower Sca	trench system	20th century	earthwork survey	HY40NW 34	OR 3028	HY4361208800	Lindsay, G (ODIN)	Lindsay 2009b
Kirkwall and St Ola, Quanterness	taphonomic study of human remains	Neolithic	taphonomic	HY41SW 4	OR 1571	HY41771292	Craig, R	Craig 2007
Kirkwall and St Ola, Ramberry	funerary/settlement	Bronze Age	excavation	HY41SW 279	OR 2890 & 2891	HY424138	Richards, C & Robertson, J	Richards, C & Robertson, J 2005
Kirkwall and St Ola, Seatter	pillbox/possible road blockade	20th century	aerial photographic interpretation	HY41SE 167		HY4689311414	Leeming, P	Leeming 2009a
Kirkwall and St Ola, St Magnus Cathedral	cathedral	Medieval	geophysical survey	HY41SW 10	OR 1565	HY4492110872	OCGU	OCGU 2009f, 2009i
Kirkwall and St Ola, Sunnybank	cist	Prehistoric	excavation	HY41SW 288	OR 03326	HY421112	Thomas, A	Thomas 2009a, 2009d
Kirkwall and St Ola, Sunnybank	cist	Prehistoric	geophysical survey	HY41SW 288	OR 03326	HY421112	OCGU	OCGU 2009d, 2009m
Kirkwall and St Ola, Watagate	?ecclesiastical	Medieval	evaluation	HY41SW 65	OR 03329	HY449107	Thomas, A	Thomas 2009b, 2009c
Kirkwall and St Ola, Hatston	burnt mound	Prehistoric	evaluation and excavation	HY41SW 6		HY43501275	Mamwell, C	Mamwell 2008
Walls, Lyness, No.2 Bungalow	WW2 house	20th century	building survey			HD310950	Lee, D	Lee 2011c
Mainland, Hoy and Rousay			sound experiments	various	various	various	Marshall, N	Marshall 2008
North Ronaldsay, Broch of Burrian	broch	Iron Age	excavation	HY75SE 30	OR 217	HY763514	Sharman, P; OCGU	Sharman, P 2005; OCGU 2005e



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North Ronaldsay, Denis Head, Old Beacon	lighthouse/remains of keepers' houses	19th century	watching brief/ excavation/ building survey	HY75NE 23	OR 238	HY79015539	Hollinrake, A	Hollinrake 2008a, 2008b
Orkney, Orkney Defence Interest Network, ODIN		19th and 20th century war-time	survey, data collection	various		various	Hollinrake, A	www.odin.uk.com
Orkney, Orkney Prehistoric Pottery Research Associates			experimental archaeology				Appleby, A/ Harrison, S	www.applepot.co.uk/neolithic_pottery/index.htm
Orkney, Orkney Museum cataloguing project	archaeological artefacts		cataloguing and photography programme				Aiano, L (Orkney Museum)	
Orkney, THING Project	thing sites	Multiperiod	various				Gibson, J	http://www.thingproject.eu/
Orkney, Orkney voles		Prehistoric	zoarchaeology	various		various	Dobney, K/ Searle, J	forthcoming
Orphir, Hobbister	no clearly defined archaeological anomalies		geophysical survey	YES		HY40100660	OCGU	OCGU 2008d
Orphir, Hobbister	sites with archaeological potential	Prehistoric	walkover survey	YES	HY30NE 53	HY39800660	OAT	Sharman 2007b
Orphir, Hobbister	palaeoenvironmental study	Prehistoric	palaeo-environmental	HY30NE 52		HY3961106640	Farrell, M/ Bunting, J	Farrell and Bunting 2007, 2008b, 2009a
Orphir, Naversdale	possible settlement activity		geophysical survey	YES	OR 1449	HY35030925	OCGU	OCGU 2010j, 2010m
Papa Westray, Holm of Papa Westray North	fish bone project	Neolithic	environmental sampling	HY55SW 2	OR 1129	HY50445228	Harland, J/ Parks, R	Harland and Parks 2008
Rendall, Brookfield	no clearly defined archaeological anomalies		geophysical survey	YES		NL38571958	OCGU	OCGU 2007d and 2007o
Rendall, Enyas Hill			survey	HY42SW 33		HY408207	Lynn, D	Lynn, D 2004a

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Rendall, Lyron	no archaeological remains were identified		watching brief	HY31NE 6	OR 1753	HY38491977	Robertson, J	Robertson 2007e
Rendall, Seafire crash site	aviation crash site	WWII	survey/excavation			HY390216	ARGOS	Heath 2010
Rendall, Tammas Kirk cemetery		Medieval	excavation	HY42SW 34		HY426210	Tools,R & Cook,M	Tools,R & Cook,M 2005
Rousay, Point of Avelshay	Gun emplacement	20th century	field visit	HY42NW 77	OR 3052	HY44902809	Lynn, D	Lynn 2009a
Rousay, Bretta Ness	settlement	MIA-Medieval	post-excavation	HY33SE 12	OR 468	HY39723324	Marwick, J	Raey and Sharman 2012
Rousay, Community outreach and archaeology project			community outreach				Gibson, J	
Rousay, Corse	drystone buildings and flag and cobble surfaces	?Medieval/19th century	geophysical survey/ excavation	HY32NE 78		HY38802835	OCGU/OAT	Sharman and Ovenden 2007
Rousay, Eynhallow			survey	various	various	HY290360	Moore, J & Thomas, A	Moore, J & Thomas, A 2007
Rousay, Orkney Gateway to the Atlantic Project	various	Multiperiod	excavation	HY33SE 10; HY32SE 19		HY3727 3037; HY3725303616; HY37532966	Dockrill/ Downes/Bond (NABO)	Dockrill, Downes and Bond 2009; Dockrill and Bond 2010; Dockrill et al 2010
Rousay, Quandale			geophysical survey	YES			OCGU	OCGU 2011f
Rousay, Quandale	various	Bronze Age – Post-Medieval	walkover survey	various	various	HY3730032500	Lee, D	Lee 2008a, 2008b
Rousay, Rinyo	settlement	Neolithic	geophysical survey	YES	HY43SW 20	OR 633	Mainland, I/ Moore, J	Mainland and Moore 2010a and 2010b
Rousay, Ditch NE of Midhowe	ditch	Iron Age	geophysical survey/ excavation	YES		HY37233036	Dockrill/ Downes/Bond (NABO)	Dockrill et al 2010
Rousay, Knowe of Swandro	settlement	Prehistoric	excavation			HY37532966	Dockrill/ Downes/Bond (NABO)	Dockrill et al 2010

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Rousay, Mound of Brough/South Howe	broch and settlement	Iron Age, Late Norse, 19th century	evaluation and excavation			HY37273037	Dockrill/Downes/Bond (NABO)	Dockrill et al 2010
Rousay, Wasbister Loch	crannog	Prehistoric	survey	HY21NE 1	OR 468	HY395334	Dixon, N & Forbes, B	Dixon, N & Forbes, B 2004
Rousay, Westness	ditch/midden		geophysical survey	YES	OR 631	HY371305	OCGU	OCGU 2010g and 2010o
Rousay, Yorville	burnt mound/settlement	?Prehistoric	evaluation/excavation	HY32NE 36	OR 461	HY39432798	Dockrill/Downes/Bond (NABO)	Dockrill, Downes and Bond 2009; Dockrill and Bond 2010
Sanday, Lady Parish, near Lady Village	symbol stone	Pictish	excavation			HY69204108	Bond/Dockrill/Gibson	
Sanday, Loth Road	funerary site	Bronze Age	excavation		OR 369	HY6055334489	Sharman, P	Sharman 2007a
Sanday, Meur	burnt mound	Bronze Age	excavation	HY74NW 9		HY747457	Tools, R	Tools, R 2005
Sanday, Stove Bay			geophysical survey	YES	OR 136	HY612353	OCGU	OCGU 2007a; 2007b
Sanday, Thrave	treb dyke/farm steading	Prehistoric - Post Medieval	desk-based assessment and walkover survey	HY74SE 19 (treb dyke), HY74SE 27 (farm steading)		HY76504384	Sharman, P	Sharman 2008a, 2008b
Sanday-Stronsay, electricity cable replacement	potential archaeological anomalies		geophysical survey	YES	various	HY61143549/ HY62452957	OAT/OCGU	Robertson 2007d; OCGU 2007b, 2007h; Robertson and Moore 2007; Sharman and Moore 2007
Sanday-Stronsay, electricity cable replacement	potential archaeological features		walkover survey/watching brief	YES	various	HY62442958/ HY62902920.	OAT/OCGU	Robertson and Moore 2007; Sharman and Moore 2007
Sandwick			environmental		various		Cluett, j	Cluett, j 2007
Sandwick			geophysical survey	YES	various		GSB & OCGU	GSB 2004 & OCGU 2004b; 2005a; 2005b; 2006a; 2006e
Sandwick, Arion Farm	flint scatter	Bronze Age/ Neolithic	fieldwalking	HY21SE 92		HY289144	Cantley, M	Cantley, M 2005

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Sandwick, Bay of Skail	potential archaeological anomalies		geophysical survey	YES	HY21NW 15	HY23881913	OCGU	OCGU 2009e, 2009n
Sandwick, Bookan Farm	settlement activity	Multiperiod	geophysical survey	YES	HY21SE 6	OR 1322 HY28461478	OCGU	OCGU 2010b and 2010p
Sandwick, Brough of Borwick	broch	Iron Age	geophysics survey	YES	HY21NW 1	OR 1237 HY22411678	Moore, J	Moore forthcoming d
Sandwick, Broch of Bigging	promontory fort	Prehistoric	geophysical survey	YES	HY21NW 7	OR 635 HY21941574	Moore, J	Moore 2010b, forthcoming c
Sandwick, Grahamsa	no archaeological remains were identified		geophysical survey/ boreholes	YES		HY236189	Card, N	OCGU 2011g
Sandwick, Loch of Stenness	crannog	Prehistoric	survey		HY21NE 1	HY260151	Dixon, N & Forbes, B	Dixon, N & Forbes, B 2004
Sandwick, Newgarth	no clearly defined archaeological anomalies		geophysical survey	YES	100m W of HY21NE 42	HY259191	OCGU	OCGU 2009i, 2009o
Sandwick, Peerie Hill Roundhouse	later prehistoric roundhouse & field system	?Bronze/Iron Age	geophysical survey/ earthwork recording	YES	HY21NW 60	OR 2898 HY2327214647	Moore, J	Moore forthcoming e
Sandwick, Ring of Bookan and Skae Frue	?henge/burials	Prehistoric	geophysical survey	YES	HY21SE 7/ HY 21 SE 8	OR 1319/ 1320 HY28341450/ HY28241440	OCGU	OCGU 2008b
Sandwick, Skail Bay	field dykes/field drains/stonework	?Prehistoric - 19th century	watching brief		HY21NW 43	OR 1247 HY23361890	Sharman, P	Sharman 2008c
Sandwick, Skail Farm	no archaeological remains were identified		watching brief		HY21NW 55	HY23181853	Lindsay, G	Lindsay 2008
Sandwick, Skara Brae Neolithic Village	no archaeological remains were identified		survey; watching brief		HY21NW 12	OR 1246 HY23121873/ HY23111872	Sproat, D; Hollinrake, A	Sproat, D 2005; Hollinrake 2007b, 2007c, 2009d
Sandwick, Snusgar	settlement	Medieval	excavation and survey	YES	HY21NW 21	OR 1255 HY236196	Griffiths, D	Griffiths 2005, 2006, 2007b, 2008, 2009; Griffiths and Harrison 2010

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Sandwick, Spretta Meadow			environmental			HY236146	Farrell, M	Farrell, M 2009
Sandwick, Stones of Via	stone setting	Prehistoric	geophysical survey	YES	OR 1264	HY21NE 3	OCGU	OCGU 2005c
Sandwick, Wasbister			survey	YES	various	HY285145	Robertson, J	Robertson, J 2005
Sandwick/South Ronaldsay, Rising Tide Project	sea-level survey	Prehistoric	coring survey			HY258149/ ND475966	Wickham-Jones/Dawson, S/Dawson, A	Wickham-Jones et al 2008
Sandwick/Stenness, The Heart of Neolithic Orkney World Heritage Site	soils, sediments and landscape history						Simpson, I	www.sbes.stir.ac.uk/people/simpson/index.html
Sandwick/Stenness, The Hearth of Neolithic Orkney World Heritage Site	artistic representations of WHS		research project				Thomas, A	http://www.orkney.uhi.ac.uk/courses/archaeology/staff/monumental-visions-art-and-archaeology-in-the-heart-of-neolithic-orkney-world-heritage-site
Scapa Flow Landscape Partnership Scheme	Scapa Flow		data collection, research, field work, community projects, training			various	Branscombe, J	http://www.scapaflow.co/index.php/
Shapinsay, Burroughston Broch	no archaeological remains were identified		watching brief		OR 1123	HY52SW 4	Card, N	Card 2007a
Shapinsay, Portable Water Scheme	potential archaeological anomalies		geophysical survey	YES		HY41NE 5	Wilkins, I	OCGU 2011c
Scapa Flow Wrecks Project	ship wrecks	WWI	desk-based survey				Bignall, A (SFLPS)	
South Ronaldsay, Banks tomb	chambered tomb	Neolithic	excavation			ND458834	Lee, D	Card and Lee 2010; Lawrence 2010; Lee 2011b



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South Ronaldsay, Blows Moss	palaeoenvironmental study	Prehistoric	palaeoenvironmental	ND48NE 7		ND4545785895	Farrell/Bunting	Farrell and Bunting 2008c
South Ronaldsay, Brough Ness	earthworks		magnetometry survey	YES		ND447834	Hedges, J	Lillie <i>et al</i> 2010
South Ronaldsay, Castle of Burwick	potential archaeological anomalies		geophysical survey	YES		ND48SW 2 OR 1872 ND43508430	OCGU	OCGU 2008e
South Ronaldsay, Isbister	chambered tomb	Neolithic	survey			ND48SE 1 OR 1881 ND47048449	Moore, J	Moore forthcoming
South Ronaldsay, Kirkhouse	mounds/structures		walkover survey			ND49SE 23 OR 2663 ND47079084	Robertson, J	Robertson 2007g
South Ronaldsay, SPEAR Project			survey/excavation			ND4683	Hedges, J	Bunting and Farrell 2010
South Ronaldsay, Old Head	various		evaluation/excavation			ND46908350	Hedges, J	Lillie <i>et al</i> 2010
South Ronaldsay, St Ola's Kirkhouse	cemetery	Medieval	excavation and survey			ND49SW 7 OR1797 ND434915	Cook, M	Cook, M 2006
South Ronaldsay, The Cairns	settlement/souterrain/roundhouse	Iron Age	excavation/geophysical survey	YES		ND48 NE14 OR 708 ND457855	Carruthers, M/OCGU	Carruthers 2006A; 2007a, 2007b; 2008, 2009a, 2009b, 2010a, 2010b; OCGU 2009h, 2009p
South Ronaldsay, The Skerries Bistro	chambered tomb	Neolithic	trial excavation			ND458834	Hedges, J	Hedges and Constantine 2010
South Ronaldsay, Windwick Bay Landscape Survey			fieldwalking/geophysical survey/hand augering	YES		various	Edwards, P	Edwards 2010
South Ronaldsay, Windwick	souterrain	Bronze Age/Iron Age	excavation	YES		ND48NE 8 OR 1864 ND460867	Carruthers, M	Carruthers, M 2006A
St Andrews, Horsick	cropmark		Aerial photographic interpretation			HY51100440	Leeming, P	Leeming 2009b

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St Andrews, Long Howe	barrow	Mesolithic/ Bronze Age	excavation	YES HY50SW 61	OR 2598	HY50940599	Wickham Jones, C; Robertson, J	Card et al 2005; Downes et al 2007; Robertson and Woodward 2007; Wickham-Jones and Downes 2007
St Andrews, Mine Howe	barrow and ritual/ metal working complex	Bronze Age/Iron Age	excavation	YES HY50NW 38	OR 63	HY510060	Card, N & Downes, J	Card, N et al 2004; 02005
St Andrews, St Peter's Bay	broch	Iron Age	geophysical survey	YES HY50SW 21	OR 61	HY536045	OCGU	OCGU 2006g
Stenness			environmental	various	various		Cluett, j	
Stenness			geophysical survey	various	various		GSB & OCGU	GSB 2004; OCGU 2004b; 2005a; 2005b; 2006a; 2006e
Stenness, Brodgar and Dyke o' Sean car park	enclosure	Prehistoric	watching brief and evaluation	YES HY21SE 68	OR 2925	HY293137 & HY294134	Card, N Sharman, P Carruthers, M & Jones, M	Carruthers, M 2006b
Stenness, Barnhouse	settlement	Neolithic	watching brief	HY31SW 118	OR 2388	HY30791271	Kirkdale Archaeology	Hollinrake 2009a, 2009b
Stenness, Happy Valley	farmhouse	19th century	building survey	HY31SW 111		HY3268910583	Card, N	Lee and Hollinrake 2011
Stenness, Loch of			environmental			HY280150	Wickham- Jones, C & Dawson, S	Dawson, S & Wickham- Jones, C 2006
Stenness, Maeshowe Chambered Tomb	chambered tomb	Neolithic	geophysical survey & watching brief	YES HY31SW 1	OR 1365	HY318128	OCGU, Murray, D & Hollinrake, A	OCGU 2005d; 2005F; Murray, D & Hollinrake, A 2006
Stenness, Ness Footpath	no significant archaeological finds or features were recorded		watching brief and test pit			HY302128	Card, N	Carey and Lee 2012

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Stenness, Ness of Brodgar	complex	Neolithic	excavation	HY31SW 112	OR 1382	HY302/3 128/9	Card, N	Card 2004; 2007b, 2008, 2009 2010a, 2010b; Card, N & Cluett, J 2005; Card, N & Sharman, P 2006; Card and Lee et al 2008; Card and Lee et al 2009, 2010
Stenness, Ness of Brodgar	complex	Neolithic	geophysical survey	HY31SW 112	OR 1382	HY302128	OCGU	OCGU 2007a
Stenness, Overbigging	archaeologically significant features		trial excavation	HY31SW 128		HY317131	Kirkdale Archaeology	Murray 2009
Stenness, Ring of Brodgar	henge/stone circle	Neolithic	excavation	HY21SE1	OR 01314	HY294133	Downes, J/ Richards, C	Downes and Richards 2008; Downes, Richards and Thomas 2008
Stenness, Ring of Brodgar	henge/stone circle	Neolithic	geophysical survey	HY21SE1	OR 01314	HY29451335	OCGU	OCGU 2009b, 2011e
Stenness, Ring of Brodgar	henge/stone circle	Neolithic	aerial photographic interpretation	HY21SE1	OR 01314	HY294133	Leeming, P	Leeming 2005, 2009c
Stenness, Rising Tide Project	indeterminate		underwater survey	YES		various	Bates et al	Bates et al 2012
Stenness, Sewer Replacement and Waste Water Treatment Works	four sites of archaeological and historical interest noted	Prehistoric- Modern	walkover survey	various	various	HY3086611569/ HY3059511563	Rees, A	Rees 2007
Stenness, Stones of Stenness	no significant archaeological finds or features were recorded		watching brief			HY30661247	Hollinrake, A	Hollinrake 2010c
Stenness, Symbols in a Landscape	artist residency		artist residency	YES			ORCA/HS/Pier Arts Centre	Hammond 2012
Stenness, The Cairns, Bay of Ireland	settlement activity	Early Historic/ Medieval	geophysical survey	YES	OR 1347	HY29050987	OCGU	OCGU 2008f
Stenness, Unstan	promontory	Prehistoric	geophysical survey	YES	OR 1361	HY283117	OCGU	nyr

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Stromness, Billia Croo	potential archaeological anomalies		geophysical survey	YES		HY 227102	OCGU	OCGU 2010a and 2010r
Stromness, Billia Croo	pit feature		walkover survey and excavation	YES		HY227102	Sharman, P/ Lee, D	Sharman 2010a; Lee 2010a and 2010c
Stromness, Breckness House	settlement	Post-Medieval	survey	YES	HY20NW 5 OR 1344	HY225093	Leeming, PJ & Mammwell, CJ	Leeming, PJ & Mammwell, CJ 2004
Stromness, Copland's Dock	various	Post-Medieval	walkover survey			HY3210	Card, N	Hollinrake 2011
Stromness, Ness Battery	WW1/WW2 military	20th century	building survey	various	OR 02383	HY248080	Lee, D	Lee et al 2010
Stromness, Ragshore	flint scatter	Mesolithic	fieldwalking		HY21SE 91	HY275115	Cantley, M	Cantley, M 2005
Stromness, Redland	southern/structure	?Prehistoric	geophysical survey	YES		HY26281381	OCGU	OCGU 2010h and 2010s
Stromsay, Links House	camp site	Mesolithic	survey/excavation	YES	HY62NE 57 OR 3327	HY650250	Woodward, N	Woodward 2007, 2008a, 2008b; Lee and Woodward 2008, 2009a, 2009b
Stromsay, Links House	camp site	Mesolithic	geophysical survey	YES	HY62NE 57 OR 3327	HY65502570	OCGU	OCGU 2008c, 2011h
Stromsay, Sands of Odie			geophysical survey	YES	various	HY628296	OCGU	OCGU 2007b
Walls & Flotta, Fara Wind Farm	various		desk-based survey and field visit		various	ND325960	Lynn, D	Lynn 2010
Walls, Cantick	Cantick peninsula		survey		various	HY341893	Robertson, J	Robertson, J 2006
Walls, Cantick			geophysical survey	YES	various	various	Robertson, J/ OCGU	Robertson 2007a, 2007h; OCGU 2007c
Walls, Lyness, Golden Wharf and Lyness Wharf	potential archaeological anomalies		geophysical survey	YES	various	various	OCGU 2010d and 2010t	OCGU 2010d
Walls, Lyness, No 2 Bungalow, Right Row	WWII buildings	WWII	building survey			ND31079506	Card, N Hoy and South Walls Landscape Project	Lee 2011c

PARISH AND SITE NAME	TYPE	PERIOD	FIELDWORK	GEOPHYS. NMRS No.	SMR No.	NGR	DIRECTOR	BIBLIOGRAPHIC REF.	
Walls, Outer Green Hill	chambered tomb	Neolithic	excavation	YES	ND38NW 9	OR 1945	ND342895	Lee, D Hoy and South Walls Landscape Project	Lee 2008c, 2009a, 2009b
Walls, Roeberry Barrow	barrow/linear dykes	Neolithic/Bronze Age – post medieval	excavation	YES	ND38NW5	OR 1940	ND34058905	Lee, D Hoy and South Walls Landscape Project	Lee 2009b, 2009d, 2010b, 2010d, 2011a
Walls & Flotta, Scapa Flow	WWII buildings	20th century	walkover survey		various	various	ND3099694650	Lindsay, G	Lindsay 2009a, 2010
West Mainland, Brough Head Wave Farm	various		walkover survey		various	various	ND3099694650	Card, N	Saunders, Sharman and Lee 2011
Westray, Berst Ness, Knowe of Skea	settlement	Bronze Age	excavation		HY44SW 2	OR 719	HY44144181	Ease Archaeology	Moore and Wilson 2007a, 2008a, 2009a
Westray, Pierowall, Costie's Lobster Warehouse	anthropogenic soil containing a small amount of animal bone and carbonised material		evaluation		HY44NW 103		HY4375848514	Ease Archaeology	Mullan 2007
Westray, Hodgalee	structural remains/ settlement	Multiperiod	geophysical survey	YES	HY44SE 3	OR 725	HY46444473	OCGU	OCGU 2008g
Westray, Knowe of Burristaie	broch	Iron Age	archaeological assessment		HY44SW 1	OR 718 & 723	HY430429	Moore, H & Wilson, G	Moore, H & Wilson, G 2006
Westray, Knowe of Skea	burials	Middle Iron Age	excavation	YES	HY44SW 2	OR 719	HY440420	Moore, H & Wilson, G	Moore, H & Wilson, G 2005b; 2006a
Westray, Langskaill	settlement	Late Iron Age/ Norse	excavation		HY44SW 9	OR 729	HY438428	Moore, H & Wilson, G	Moore, H & Wilson, G 2005a
Westray, Links of Noltland	settlement	Neolithic/Bronze Age	excavation, survey	YES	HY44 NW 33	OR 1976	HY428493	Moore, H & Wilson, G	Moore and Wilson 2007, 2007b, 2007c, 2007d 2007e, 2008b, 2009b, 2010, 2011
Westray, Links of Noltland	settlement activity	Bronze Age/ Neolithic	geophysical survey	YES	HY44 NW 33	OR 1976	HY428493	OCGU	OCGU 2007e; 2010f; 2010u



PART 4

PARISH AND SITE NAME	TYPE	PERIOD	FIELDWORK	GEOPHYS. NMRS No.	SMR No.	NGR	DIRECTOR	BIBLIOGRAPHIC REF.
Westray, Links of Noltiland: an archaeological analysis	settlement		archaeozoological analysis	HY44 NW 33	OR 1976	HY428493	McSweeney, K	www.ed.ac.uk/schools-departments/history-classics-archaeology/research/prizes-awards/awards
Westray, Noltiland Castle	cropmark		aerial photographic interpretation	HY44NW 104	OR 911	HY42904875	Leeming, P	Leeming 2009d
Westray, Quoygrew-Nether Trenabie	settlement	Viking/Medieval	excavation	HY45SW 4	OR 677	HY443507	Barrett, J & Gerrard, J	Barrett, J 2005
Westray, Rapness	no archaeological remains were identified		evaluation	HY54SW 1	OR 878	HY2098841668	Ease Archaeology	Brend 2007
Westray, Tuquoy	post excavation	Medieval	post-ex	HY44SE 5		HY45464313	Historic Scotland	in prep
Stenness/Sandwick, World Heritage Area – Inner Buffer Zone	various		geophysical survey	various	various	various	OCGU	OCGU 2007p, 2008b, 2008h, 2011a
Wyre			survey	various	various	HY445262	Thomas, A	Thomas, A 2006
Wyre, Braes of Ha' Breck	settlement activity	Neolithic	geophysical survey	HY42NW 79	OR 8005	HY4374025933	OCGU	OCGU 2010c, 2010n
Wyre, Braes of Ha' Breck	settlement	Neolithic	survey/excavation	HY42NW 79	OR 8005	HY437259	Thomas, A	Thomas 2007a, 2007b, 2008, 2009e, 2010; Thomas and Lee 2010a, 2010b, 2011
Wyre, Mire	palaeoenvironmental study	Prehistoric	palaeo-environmental			HY4420026200	Farrell/Bunting	Farrell and Bunting 2009b
Wyre, St Mary's Chapel	Chapel	Medieval	minor excavation	HY42NW 4	OR 795	HY4429826285	Kirkdale Archaeology	Hollinrake 2009e

## APPENDIX E – PHD RESEARCH RELATING TO ORKNEY AS AT MAY 2012

- Best, J. Living in Liminality: An osteoarchaeological investigation into the role of avian resources in marginalized Scottish island environments (University of Cardiff).
- Bishop, R. Plant gatherers, plant managers or agriculturalists?: the importance of wild and domestic plants in Mesolithic and Neolithic Scotland (Durham University) – Braes of Ha'breck, Wyre.
- Budd, C. Marginality, metaphor and meaning: stable isotope studies of diet and subsistence aimed at understanding the adoption of agriculture during the Neolithic and Bronze Age periods in the Orkney Islands (University of Hull).
- Carruthers, M. Practice, Place and Identity in the Orcadian Iron Age c800BC-AD200 (University of Manchester).
- Cooke, S. Man and Animal in Late Iron Age and Viking Scotland (Orkney College University of the Highlands and Islands).
- Crozier, R. A taphonomic study of the human remains from Neolithic Orkney (Queen's University, Belfast).
- De Rees, S. Orkney Food Ethnology (Centre for Nordic Studies, UHI).
- Fraser, S. Faunal remains at Links of Noltland, Westray (University of Edinburgh, HS funded).
- Gooney, D. The osteological examination of the human skeletal remains from Berst Ness, Westray (University of Edinburgh, HS funded).
- Heide, P. Communication, Settlement and Landscape – social development in Norse societies in the Viking Age and Early Middle Ages, c. 800-1200 A.D. (University of Aarhus).
- Hogg, L. Domesticated animals, identity and social change in Norse influenced North Atlantic Europe, c. AD 700-1200 (University of Cardiff).
- Jones, J. Diversification and Sustainability in Ancient Coastal Communities: The Role of Marine Resources (University of Cardiff).
- Keir, A. Coastal change and archaeological heritage in Northern Scotland (Orkney College University of the Highlands and Islands).
- Law, M. Settlement and land use in Neolithic coastal communities (University of Cardiff).
- Lawrence, D. Orkney's first farmers: the effects of environment, society and subsistence on the inhabitants of Orkney at the dawn of agriculture (University of Bradford).
- Mamwell, C. 'It rained a lot and nothing much happened': land use, settlement and society in Bronze Age Orkney (University of Edinburgh).
- Marwick, A. The impact of social and economic change on North Ronaldsay (Centre for Nordic Studies, UHI).

## PART 4

- McKenna, L. Links of Noltland, Orkney: Land management and palaeo-landscape narratives from soil and sedimentary records (University of Stirling).
- Moore, J. Space and society in Iron Age Orkney (Orkney College University of the Highlands and Islands).
- Potts, G. Investigating Late-Holocene Climatic Fluctuations Using Palaeoecology in the Orkney Islands (University of Manchester).
- Renwick, E. The experience of space and place in World Heritage Site Management (Orkney College University of the Highlands and Islands).
- Thomas, A. Image-making and inscription as social practice: Orkney's rock art and graffiti (Orkney College University of the Highlands and Islands).
- Watterson, A. Creative Media for Interpretive Archaeology (Glasgow School of Art).

**APPENDIX F – NEOLITHIC ORKNEY 2000-2010 – A SYMPOSIUM PROGRAMME AND PARTICIPANTS****November 15th & 16th 2010 | St Magnus Centre, Kirkwall**

*Monday 15th*    *Symposium Papers – what’s new in the Orcadian Neolithic?*

10:00 - 10:30    Tea & coffee

10:30            Welcome: Doreen Grove, Head of Understanding & Access, Historic Scotland

Opening remarks from Dr Jane Downes, Head of Archaeology, Orkney College UHI

10:50            Links House, Stronsay | Naomi Woodward, Department of Archaeology, University of Aberdeen

11:10            Green, Eday | Mick Miles, British Excavation Volunteers and Archaeological Research Society

11:30            Braes of Ha’Breck | Antonia Thomas, Orkney Research Centre for Archaeology, Orkney College UHI

11:50            Cuween, Wideford and Stonehall | Dr Richard Jones, School of Humanities, University of Glasgow and Dr Colin Richards, School of Arts, Histories and Cultures, University of Manchester

**12:30 - 13:30    Break for lunch**

13:30            Crossiecrown | Nick Card, Orkney Research Centre for Archaeology and Dr Jane Downes, Head of Archaeology, Orkney College UHI

13:50            Knowes of Trotty | Dr Jane Downes, Head of Archaeology, Orkney College UHI

14:10            Ness of Brodgar | Nick Card, Orkney Research Centre for Archaeology, Orkney College UHI

14:30            Links of Noltland | Hazel Moore, Graeme Wilson, EASE Archaeology

14:50            Vestrafiold | Dr Colin Richards, Reader in Archaeology, School of Arts, Histories and Cultures, University of Manchester

15:10            Ring of Brodgar | Dr Colin Richards, Reader in Archaeology, School of Arts, Histories and Cultures, University of Manchester and Dr Jane Downes, Head of Archaeology, Orkney College UHI

15:30            Tea & coffee

15:50            Cantick, Hoy | Dan Lee, Orkney Research Centre for Archaeology, Orkney College UHI

16:10            Past sea level change and the changing landscape of the World Heritage Site. | Caroline Wickham-Jones, Department of Archaeology, University of Aberdeen and Dr Sue Dawson, Geography, School of Social and Environmental Sciences, University of Dundee

16:30            The Scottish Ten at the Heart of Neolithic Orkney World Heritage Site | Chris McGregor, Director, Conservation Group, Historic Scotland and Dr Lyn Wilson, Scottish Ten Project Manager, Historic Scotland

16:50 – 17:45    Discussion session (tea & coffee)

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19:30 for 20:00 Symposium buffet dinner at the Kirkwall Hotel

## PART 4

Tuesday 16th Themes & Workshops

09:00 - 09:30 Tea & coffee

09:30 **Landscape**

2008 RCAHMS aerial survey | Dave Cowley, Royal Commission on the Ancient and Historic Monuments of Scotland

Putting it all in context: archaeological geophysics across the Heart of Neolithic Orkney | Mary Saunders, Orkney Research Centre for Archaeology Geophysics Unit, Orkney College UHI

10:00 **Agriculture & Environment**

Recent work on archaeofauna in the light of other work in and around the World Heritage Site | Dr Ingrid Mainland, Orkney College UHI

Neolithic landscapes: using palaeoecological data to contextualise the archaeological record | Dr Michelle Farrell, Department of Geography, University of Hull

The vegetation record from the Ring of Brodgar and Stronsay | Dr Bob McCulloch, School of Biological and Environmental Sciences, University of Stirling

10:45 – 11:00 **Artefacts**

Artefacts can tell stories too – examples from Neolithic stone tools and axes. | Ann Clarke, lithic specialist

1:00 – 11:30 **Populations**

Neolithic insights from Isbister | Dave Lawrence, University of Bradford & Orkney Museum

The devil's in the detail? A taphonomic study of human remains from Neolithic Orkney | Rebecca Crozier, School of Geography, Archaeology and Palaeoecology, Queen's University Belfast

11:30 **Dating**

OSL Dating and the Neolithic in Orkney | Dave Sanderson, Scottish Universities Environmental Research Centre

11:45 Break into groups for facilitated discussion sessions

13:00 - 14:00 **Break for lunch**

14:00 Break into groups for facilitated discussion sessions

15:15 Summaries and final discussion

16:00 Disperse



## SYMPOSIUM DISCUSSION GROUP MEMBERS (FACILITATOR IN ITALICS)

**Landscapes and Seascapes***Dave Cowley, RCAHMS*

Adrian Challands

Sue Dawson

Bobby Forbes

Julie Gibson

Alette Kattenberg

Mark Littlewood

Chris McGregor

Edward Pollard

John Raven

Mary K Saunders

Stephen Watt

Caroline Wickham-Jones

Ian Wilkins

Graeme Wilson

**Agriculture and Environment***Rod McCullagh, HS*

Martin R Bates

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Michelle Farrell

Jakob Kainz

Dan Lee

Ingrid Mainland

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**Monuments and Material Culture***Alison Sheridan, NMS*

Nick Card

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