

Inspired

The IT capabilities of the Scottish Sites and Monuments Records

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Executive Summary

There have been extraordinary technological advances made by the Historic Environment community since the Baker report (Baker 1999). Entire new systems have emerged for the management and curation of Historic Environment data; technology has advanced a pace; the web has become ubiquitous, and local authority Historic Environment curators have had to become technically aware of database technology, GIS and geographic capabilities and the serving up of data online. But, while the technology has changed, the basic services the local authority curators provide remains very similar. (Casey 2009)

The SMRs/HERs are spread across a range of local government departments from planning to museums with services hosted within Council departments or contracted out to commercial contractors or Trusts (Appendix 1). The only common thread is the provision of development control advice to planning departments.

This model for the delivery of services locally seems to be relatively stable. Although there may be changes in service provider, the sector as a whole has become well established and an accepted part of the development process.

But, this model has its problems. The local services have had extremely limited resourcing, they are spread between different Council departments and all have different remits. Any move toward increased cooperation between local and national services must start by understanding these limitations and the constraints budget and local policy place on local services.

The vision of Geographic Information policy is to deliver government efficiency by streamlining the delivery of services. The model is one where information is created, curated and served up at the most effective level of government then shared through joined systems to be used many times by the public and the private sectors.

The European Union *INSPIRE* directive is to be transposed into UK legislation in September 2009. A joint Scottish Historic Environment dataset will need to be in place by September 2011 if it is to be included under *INSPIRE's* Annex I, Protected sites.

INSPIRE's Protected sites includes archaeological and historic sites.

A joint Scottish Historic Environment dataset will include data supplied nationally by HS for designated sites and by RCAHMS and locally by the SMRs and HERs for undesignated sites.

Local authorities are yet to adopt Geographic Information policy in line with *INSPIRE*, *Place Matters* and *One Scotland, One Geography*. However, some Geographic Information specialists did identify the Historic Environment as a data set of national rather than just local interest.

Policy is the most significant barrier preventing data sharing. Policy in the form of service level agreements will be required nationally, locally and within and between organisations to remove barriers to data sharing.

All but two of the local Historic Environment services have the hardware and software that enable a system to be interoperable.

While most local Historic Environment services have the equipment to deliver interoperable services many do not have the funding to create and maintain interoperable data.

With the production of draft standards for polygonisation expected this summer (2009), all the standards required to deliver a joint Scottish Historic Environment data set are in place.

Ten of the 16 local Historic Environment services can already deliver data that meet the agreed standards for interoperability and two are working toward this.

HEIRNET provides the Historic Environment with a resource discovery mechanism and all but three of the services providers are registered on it.

GI data is available from all the local services on request. Eight of the services host their entire SMR online and three are already using web services (the tool most likely to be used to deliver data between organisations in the future) to feed their web sites.

Inspired! An Assessment of the IT Capabilities of the Scottish Sites and Monuments Records.

Introduction

- 1 Government efficiency and the important role that location - Geographic Information (GI) - has to play in enabling government to deliver streamlined services has led to a raft of recent national and international legislation and policy. The guiding principle is that, 'data should be created once and used many times.' Scotland's Geographic Information Strategy goes on to say that, '... barriers to data sharing within and between organisations must be identified and resolved.' The documents present a model for the future where national data sets are made of collections of central and local geographic information, '... co-ordinated and "joined up" across central and local government bodies.' (Scottish Executive 2005, p 14).
- 2 It will be the Scottish Sites and Monuments Records (SMRs) and Historic Environment Records (HERs) (Appendix 1), in co-operation with Historic Scotland (HS) and the Royal Commission on the Ancient and Historical Monuments of Scotland (RCAHMS) that will, together create the core Scottish Historic Environment data sets.¹ The local authority services have an important role in providing data locally that can be used many times. To understand how the services meet this challenge, it is important to establish the current IT capabilities of the Scottish Sites and Monuments Records.

Aim

- 3 This report aims to answer this question by looking at the legislation and policy, at the impact this is already having on local government and how local Historic Environment services are likely to be affected. The report will go on to look at how close local services are to being able to support and participate in delivering a co-operative joint Scottish Historic Environment data set.

Background

- 4 Peter McKeague (RCAHMS), in his award-winning *One Scotland, One Geography, One Historic Environment* paper (McKeague 2008) first identified the need for Scottish Historic Environment data to be considered within the framework of *INSPIRE* and he identified the data sets that will together form a joint Scottish Historic Environment data set. McKeague's paper and subsequent discussions between Historic Scotland (HS), RCAHMS and the ALGAO Scotland Historic Environment Record Forum (HER Forum) led to the need for this study being identified. More specifically, the need to look at the IT capabilities of the SMRs in relation to GI policy and the continued drive to make local authority data available via PASTMAP.² The bid for the project was prepared by the HER Forum and submitted by the late Ian Shepherd representing the Forum and Rebecca Jones (RCAHMS). The study is funded by Historic Scotland and sponsored through Mairi Davies (HS).

Previous work

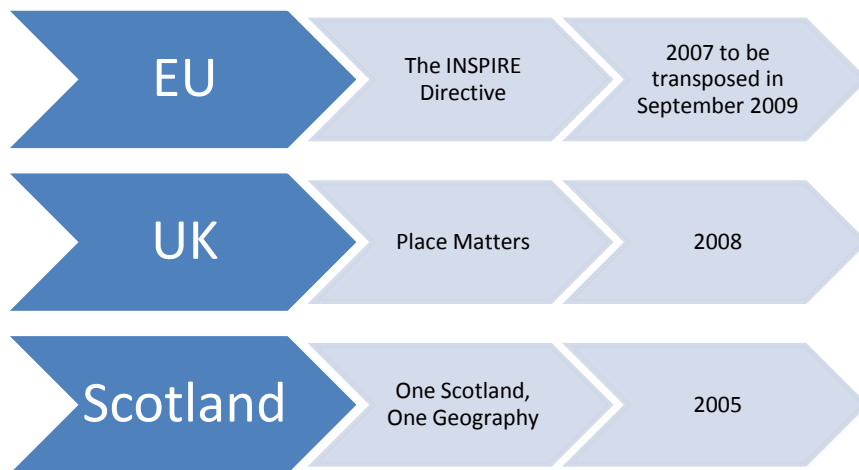
- 5 This study builds on the work started in the following reports:
- Baker, D 1999, *An Assessment of Scotland's Sites and Monuments Records*
 - Flower, C et al 2001, *Report on the Working Group on the Operational Roles of the SMRs*
 - Coleman, R et al 2004, *Managing Urban Data: A Study of SMRs, the NMRS and User Groups*
 - Jeffrey, S 2005, *On-line Delivery of Archaeological Information for Farmers*

Methodology

- 6 Two groups have been consulted in the preparation of this report.
- 7 The first group comprised the Scottish Sites and Monuments Records and Historic Environment Records (Appendix 1). A questionnaire was circulated to all sixteen services, with a follow-up on-site visit to each to allow more detailed discussion of comments made in the questionnaires. Notes made during the on-site visits were added to the questionnaire, with a copy being sent to the local service to confirm that the responses accurately reflected their views.
- 8 The second group consulted was the local authority Geographic Information IT specialists (Appendix 2). The responses give a valuable insight into the workings of the Historic Environment and GI communities but may sometimes be perceived as controversial. To allow the focus to remain on the issues the authors of some quotes have not been named. Those that are named have been offered the opportunity to read and modify their contribution within the sections where they are quoted.
- 9 To reduce the impact on the local services, the questionnaire contained questions that will be used to inform three reports and a polygonisation standard (Appendix 4). Synthesised results can be found in Appendix 6.

Part 1: National and International Legislation and Policy

- 10 In recent years there has been a change in what data governments see as important. Previously, the main reference was “who” or “what” is it? The change in thinking is based on the realisation that ‘everything happens somewhere,’ (UK Geographic Information Panel 2008, p 8, para 1) and now “where” is seen as an equal to “who” or “what”.
- 11 The shift in perception has initiated three documents that will have an impact on how Geographic Information is curated and disseminated. These are:
- At a European level: *The INSPIRE Directive* (European Commission 2007)
 - At a UK level: *Place matters: The Location Strategy for the United Kingdom* (UK Geographic Information Panel 2008)
 - At a national level: *One Scotland - One Geography: A Geographic Information Strategy for Scotland* (Scottish Executive 2005)



The creation of GI strategy documents at European, UK and national levels emphasises how important Geographic Information is to enable government to deliver services

The INSPIRE Directive

- 12 The *INSPIRE Directive* aims at, ‘establishing an infrastructure for spatial Information in the European Community.’ (European Commission 2007 L 108/1)
- 13 It sets out an approach to the more systematic and effective use of environmental Geographic Information in the development and delivery of policy and services, and it aims to streamline government by making more efficient use of the Geographic Information it collects. In Paragraph Three, *INSPIRE* identifies the problem as the, ‘availability, quality, organisation [and] accessibility’ of data and goes on to say:
- 14 ‘Solving these problems requires measures that address exchange, sharing, access and use of interoperable spatial data and spatial data services across the various levels of public authority and across different sectors.’ (European Commission 2007, L 108/1 para 3)

15 In Paragraph Six the Directive sets out the principles of how this should be done, saying:

- ‘... spatial data [should be] stored, made available and maintained at the most appropriate level ...’
- ‘ [it] should be ... possible to combine spatial data from different sources ... and share them between several users ...’
- ‘ [it] should be ... possible for spatial data collected at one level ... to be shared between other[s]...’
- ‘spatial data [should be] made available under conditions which do not unduly restrict their extensive use.’
- ‘it [should be] easy to discover available spatial data, to evaluate their suitability for the purpose and to know the conditions applicable to their use.’

Adding in Article 4.4 that *INSPIRE*, ‘does not require [the] collection of new spatial data.’ There is an unstated expectation that data has already been created to meet an e-government agenda.

16 As well as the measures on how the directive will deliver streamlined services and efficiency, the directive prioritises the data sets it identifies as being most important to environmental protection (Appendix 5).

17 The draft specification document maps Historic Environment data to Protected Sites, saying: ‘Protected sites may also apply protection to person-made objects including buildings; pre-historic and historic archaeological sites; other cultural objects, or sites with specific geological, hydrogeological or geomorphological value.’ (*INSPIRE* Thematic Working Group Protected Sites 2008, p vi)

18 Protected Sites are defined as: ‘An area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means.’ (European Commission 2007, L 108/1, Annex I, para 9)

19 The data specification goes on to clarify that, ‘Sites may receive protection due to more than one type of objective, and may have a double or multifarious designation status,’ and that, ‘protected sites have a known location ... based on formal, legal or administrative agreements or decisions.’ (*INSPIRE* Thematic Working Group Protected Sites 2008, p vii)

20 *INSPIRE* is to be transposed into UK legislation in September 2009 with Article 6 setting a timetable for the delivery of Annex I and II data at two years following *INSPIRE*’s adoption and five years for Annex III.

Place Matters: the Location Strategy for the United Kingdom

- 21 This document adopts the principles of the *INSPIRE directive* and applies them across the whole of UK government (UK Geographic Information Panel 2008, p 15, para 23).
- 22 It identifies the problem with Geographic Information as: ‘Currently, too few government-owned datasets that incorporate location can be easily assembled and analysed with reliability from across local and central government bodies. There remains too much duplication, too little reuse and too few linkages across datasets which are required to support policy implementation in, for example, planning, housing, flooding, social exclusion and traffic management.’ (UK Geographic Information Panel 2008, p 8, para 2)
- 23 Further: ‘... users of Geographic Information spend 80 per cent of their time collating and managing the information and only 20 per cent analysing it to solve problems and generate benefits.’ (UK Geographic Information Panel 2008, p 12, para 15)
- 24 Like *INSPIRE*, the *Place Matters* strategy sets out a list of principles on how to deliver, specifying that information about UK’s land, sea and air should be:
 - ‘fit for purpose’
 - ‘collected once to universally accepted standards’
 - ‘appropriately maintained and used many times by the public and private sector’
 - ‘referenced to a definitive information framework which supports its seamless combination’
 - ‘easy to discover, and with clear terms for its use’
 - ‘simple to access and easy to share and integrate’
 - ‘understood sufficiently to maximise its application’
 - ‘aligned with Europe and the *INSPIRE Directive*.’ (UK Geographic Information Panel 2008, p 16, pp 25)
- 25 As a starting point, and with the aim of reducing duplication, *Place Matters* requires that all public sector organisations maintain up-to-date details of location related data sets and actively make these details publicly available, ‘even if the dataset itself is not publicly accessible or is not free of charge.’ (UK Geographic Information Panel 2008, p 19, para 31)
- 26 Like *INSPIRE*, *Place Matters* defines a list of what it calls, ‘Core Reference Geographies.’ These equate to *INSPIRE*’s three Annexes and define what data should be prioritised, stating that, ‘eventually [reference geographies will] encompass the scope of the EU *INSPIRE Directive* themes.’ (UK Geographic Information Panel 2008, p 36)

27 To deliver, the document states: 'This Strategy will require clear top management leadership and strong, authoritative and cross-cutting governance.' (UK Geographic Information Panel 2008, p 24, para 58) Suggesting that: 'Government departments and other public sector bodies should establish a number of pilots and joint ventures and encourage the adoption of new standards and approaches creating innovative public services by combining different government data.' (UK Geographic Information Panel 2008, p 22, para 51)

One Scotland, One Geography: A Geographic Information Strategy for Scotland

28 *One Scotland, One Geography* reflected the principles on data sharing being debated in Europe at the time. Some two years before the *INSPIRE Directive*, the strategy set out an approach to the, 'more systematic and effective use of Geographic Information in the development and delivery of policy and services to the benefit of the people of Scotland.' (Scottish Executive 2005, p 3)

29 'In one form or another, Geographic Information supports virtually every aspect of the work of the public sector in Scotland, for both central and local government. It is equally important for the private, community, voluntary and academic sectors.... Geographic Information is at the heart of the work of central government. For example, GI supports virtually every aspect of the work of the Scottish Executive (now the Scottish Government).' (Scottish Executive 2005, p 22)

30 In principle, the strategy is very much the same as *INSPIRE* and *Place Matters*. It identifies the problem; it defines it's "key" geographies (Scottish Executive 2005, p 12) and it sets out the principles by which streamlining and government efficiency can be achieved. These principles being:

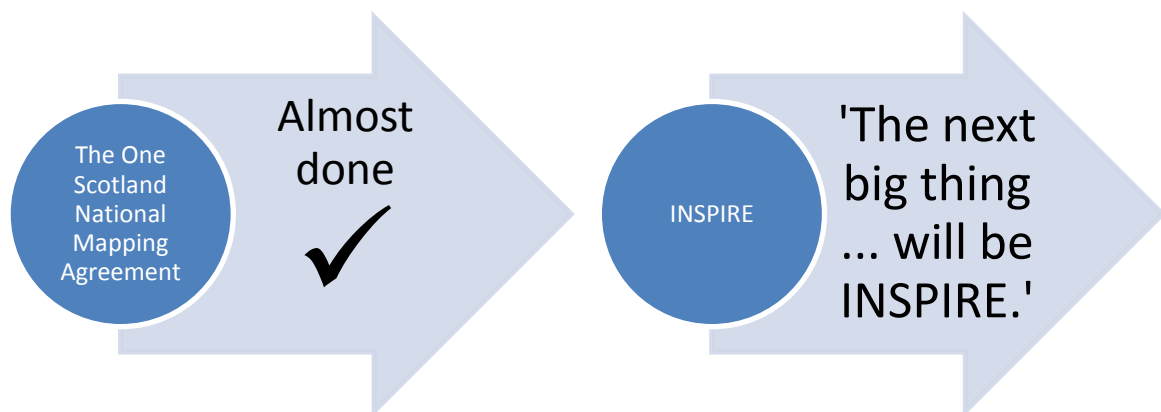
- to remove barriers to efficient and effective use of geographic information
- to avoid duplication of effort
- that Geographic Information should be co-ordinated and "joined up" across central and local government
- that data should be created once and used many times
- that barriers to data sharing within and between organisations must be identified and resolved (Scottish Executive 2005, p 14)

Part 2: Local Government

- 31 *One Scotland, One Geography* was published in November 2005; *Place Matters* in November 2008 and, at the time of writing, *INSPIRE* is due to be transposed into national legislation in September 2009.
- 32 It is early days but the Scottish Government's Geographic Information coordinator³ and organisations such as the Association of Geographic Information (AGI) are beginning to raise awareness of the importance of GI strategy. Because of their work, there is an assumption that local government GI professionals will be taking guidance and briefing their local authorities. With implications on interoperability, data standards, service delivery technologies, IT purchasing and cross department cooperation, it is imagined that GI strategy is informing decision-making and developments across local government.
- 33 In most cases, Historic Environment services are just one of many GI data resources maintained locally. GI policy adopted by local authorities will impact on what Historic Environment services can deliver. This section will begin by looking at the responses of local government GI professionals to a short questionnaire and how their implementation of local authority policy is likely to affect local Historic Environment services, before going on to look at the IT capabilities of the local services themselves.

Geographic Information Policy

- 34 The Scottish Mapping Agreement is the first cross governmental agreement due to be delivered as a result of *One Scotland, One Geography*. At the time of this survey,⁴ the implementation of *INSPIRE*, *One Scotland* and *Place Matters* was not yet seen as a priority by local authority GI professionals:



Local authority GI professionals see INSPIRE as the next big government GI initiative

'This isn't the right time ... to be developing any new initiatives, not until the mapping agreement has been sorted.' Local authority IT or GI professional.

'We expect guidance before we can consider implementing anything like this (*INSPIRE*) and at the moment ... the focus is on the One Scotland Mapping Agreement.' Local authority IT or GI professional.

'The One Scotland Mapping Agreement [is] the present priority, the next big thing ... will be *INSPIRE*.' Local authority IT or GI professional.

35 Almost uniformly across the local government GI sector the urgency is to develop and rationalise existing GI systems: '... none of these things (GI systems) are fully developed in [our local authority], [GI is implemented] on a needs basis.' Local authority IT or GI professional

36 Priorities in the local authority GI sector are:

- to develop in-house corporate GIS available to council staff
- to formalise the delivery of in-house corporate GIS systems (in some cases this means out-sourcing supply)
- to improve information management by adopting standards
- to develop a local GI strategy.

37 GI development has been organic, responding to demand and often without standards. The focus of local GI staff is to rationalise and formalise what they already have. What comes next is not their priority and to date councils are not debating *INSPIRE*'s impact.

'The council at a corporate level has not yet considered it (*INSPIRE*).' Local authority IT or GI professional.

38 Yet, from what they go on to say, the ethos of *INSPIRE*, *One Scotland* and *Place Matters* is permeating through into GI delivery.

'I would say that this is the way the Council is going.... The principles of sharing and storing data once have already been agreed in the council.... It has already been implemented [locally] in health and social work.' Local authority IT or GI professional.

39 For a few *INSPIRE* is on the agenda: '[We have] already started but the main impact will be felt in 2009.... [We have] begun a review of the metadata and are creating a register of [GI] resources. We are planning to launch web services next year (2009).' Local authority IT or GI professional.

40 Web services is seen as the key technology that will enable data to be collected locally/nationally to be used many times both locally and centrally. An explanation of web services can be found in Appendix 7. In essence, web services allow GI information created by one organisation to be viewed and used remotely by others using a portal [a website that combines data from more than one source] or by using the web service to pull the data into the remote user's GI software.

41 Most local authorities are waiting for guidance on *INSPIRE*: 'The [present] strategy is driven by the Council, not the *INSPIRE* directive or *One Scotland*. It is driven by what councillors want not government policy.' Local authority IT or GI professional.

'We are waiting for the message to come down from the top. There is no guidance as yet as to what a local authority has to do.'

Local authority IT or GI professional.

42 And some local authorities are clearly jaded by initiative overload and the perceived failure of past initiatives to deliver:

'We are not overly excited by these things. They say the right things but don't follow through with funds.' Local authority IT or GI professional.

'*INSPIRE* will fall by the wayside eventually ... we won't be doing anything until we are told to by central government and [then] they will have to come up with the money ... We haven't any council expertise to develop [*INSPIRE*] ... [and there is] no funding locally.' Local authority IT or GI professional.

43 Funding and the need to make a business case is a common theme:

'For local authorities to do anything you need a business case. It (*INSPIRE*) is not going to happen without funding.' Local authority IT or GI professional.

'If central government were to identify SMR databases as a priority dataset (*INSPIRE* Annex I) to be made available to other government bodies as part of the adoption of *INSPIRE* ... this would help develop a business case.'

Local authority IT or GI professional.

'We already use web services internally.... The technology isn't an issue. It's the business case that is important.' Local authority IT or GI professional.

44 With regards to making a business case for Historic Environment data, one GI Officer does offer a suggestion: 'If central government were to identify SMR databases as a priority dataset (*INSPIRE* Annex I) to be made available to other government bodies as part of the adoption of *INSPIRE* ... this would help develop a business case.' Local authority IT or GI professional.

45 He also suggested that a pilot is needed to test the technology, saying: 'The obvious areas for a pilot would be data sets that are of interest nationally. Most Council data sets aren't so the obvious pilots would be archaeology or pipes and roads.'

A view reinforced by another of the GI officers:

'It makes sense to deliver a national product for archaeology, as there is a much broader interest group.' Local authority IT or GI professional.

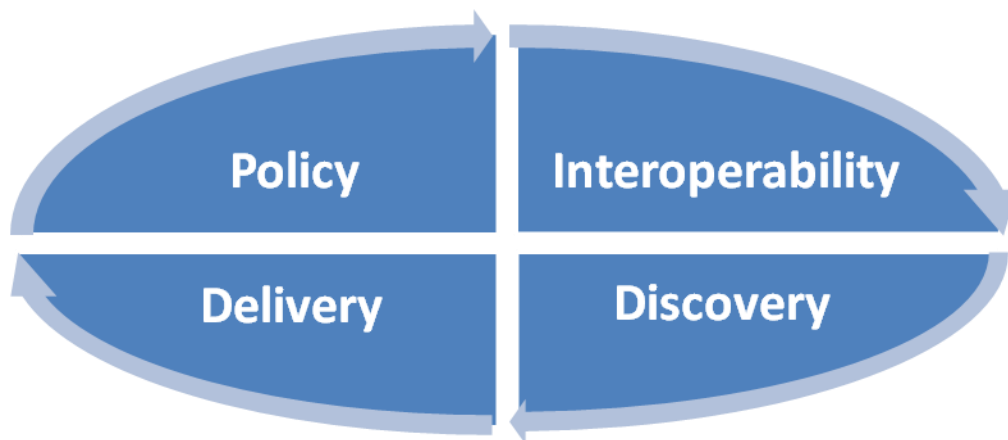
46 It should be noted that, in March 2009, Defra (Department of the Environment, Food and Rural Affairs) launched an *INSPIRE* consultation on the AGI website (AGI 2009).

IT in the Local Historic Environment Services

47 Since Baker wrote his report in 1999, advances in information technology and the internet make issues of hardware and software compatibility far less critical. However, this data is of interest and it is available in Appendix 5. The results will be presented here with relation to the wider issues of GI policy as discussed above.

48 For local Historic Environment services to deliver the INSPIRE, One Scotland and Place Matters vision, four elements are need. These are:

- policy
- interoperability
- a discovery mechanism
- a delivery mechanism.



The four key elements needed to deliver “joined up” GI services that can be used many times

Policy

49 Policy is required to allow data to be, ‘stored, made available and maintained at the most appropriate level,’(European Commission 2007, L 108/1 para 6) and it is required at national, local and service levels, if, ‘barriers to data sharing within and between organisations,’ are to be, ‘identified and resolved.’ (Scottish Executive 2005, p 14)

50 If the sector were to create and maintain a joint Scottish Historic Environment data set, made up of local and national data sets, there must be policy that both recognises the value of Historic Environment data and supports its maintenance and supply. This policy is not yet formally defined but, as a minimum, there will be a need for local and central policies, by individual organisations and between them that:

- adopt the principles of GI policy
- list Historic Environment GI resources
- support HE data supply
- support HE data maintenance.

Local GI policy

- 51 From the results of the survey of GI professionals working in local authorities, it is clear most Councils have not yet debated, let alone adopted, national GI policy.
- 52 For many of the local Historic Environment curators this survey was their first encounter with national GI policy and none had yet had time to consider how to update existing policy. When asked what their policy was regarding the sharing of GI data, all said they will either share their data or would if they could, i.e. if barriers were removed.

Policy listing Historic Environment GI resources

- 53 Through undertaking this study it has become clear that local policy is required on the listing of Historic Environment GI resources and making this list publicly available.

Policy on the supply of Historic Environment data

- 54 Policy, in the form of service level agreements, will need to be in place at national, local authority, local authority department and local authority service levels for a joint Scottish Historic Environment data set to be sustainable. From the results of the survey conducted in support of this report, it appears that no local Historic Environment services, or at most only a few, have such a guarantee.
- 55 This survey has been conducted at the high water mark in terms of Historic Environment service provision. When surveyed, all 32 local authorities had access to an SMR or an HER staffed by a recognised archaeological professional. In March 2009, North Lanarkshire terminated its relationship with West of Scotland Archaeological Service (WoSAS). WoSAS have supplied North Lanarkshire with the data they have collected for this Council area and the SMR is now maintained by the North Lanarkshire planning department, with archaeological advice provided by Rathmell Archaeology Ltd.
- 56 Six of the local services have been moved between Council departments since they were set up, and two of the services have only recently been created following many years with no SMR coverage in their areas. It is therefore unlikely that local services will be able to guarantee data supply until the value of their data has been recognised locally.
- 57 The value and usefulness of local data is something that is a core issue to the local Historic Environment curators and will be fundamental if 'barriers to data sharing' are to be resolved.
- 58 When asked about delivering data via web services, one local authority service presented a very pessimistic view: 'Not a priority ... as soon as data is made available, it invites public participation and engagement and opens yourself up to criticism and resource implications.' SMR/HER service.

Adding in answer to another question that: 'If we put this info out and we have made a mistake we may be prosecuted.' SMR/HER service.

When asked who would find the data useful, the service response was: '[I] don't believe there is the public interest ... we (the HE community) exaggerate the demand ... We get very few requests for information, not much more than a trickle.' SMR/HER service.

59 There is a genuine feeling the data created by the local services will be used against them:

‘The more information there is, the more people try to circumvent or undermine you, for instance, where there has been an event and an event polygon is added, the non specialist users read this as meaning there are no longer any archaeological issues.’ SMR/HER service.

60 There are numerous concerns from many of the local services about how the information might be used:

‘We have to be careful. Farmers might resent us putting out data to the public. It might put unacceptable constraints on farmers to protect what doesn’t need protecting. There is a lot of data that is of dubious value [and] it might encourage people on to visit farmland looking for sites....’ SMR/HER service.

61 There are also concerns about the data not being fit for purpose:

‘The SMR has been created for council use. It’s not in a fit state for public use. It wasn’t created for public outreach. It’s not a tool to be used for public engagement.’ SMR/HER service.

62 Income generated from providing data is important to some. Three services have to provide between 15 to 25% of their own service budget through data downloads.

‘As this generates income at present due to the time it takes to compile data it would be in our interest to limit this (making data freely available.)’ SMR/HER service.

‘We need a system that encourages consultation not one that tries to circumvent it.’

SMR/HER service.

63 By far the greatest concern is that the local services will not be consulted if their data is made available, leading to the data not being properly understood:

‘We don’t want people making their own judgements, we want them to come and speak to us first so we know what they are going to use the data for. That way when we give it to them, which we will, we can advise them of what to look out for and what the pitfalls in the data are.’ SMR/HER service.

‘We need a system that encourages consultation not one that tries to circumvent it.’ SMR/HER service.

‘It is the interpretation and the mediation of the data that is important.’ SMR/HER service.

64 A detailed study looking at the needs for Historic Environment data and the needs of the users of Historic Environment data is available in the report, *The Shape of Things to Come: What are needs for Scottish polygonised Historic Environment data?* (Middleton 2009a forthcoming).

Policy on the maintenance of Historic Environment data

65 To maintain data and keep data secure there needs to be policy that assures access to:

- IT support
- backup facilities.

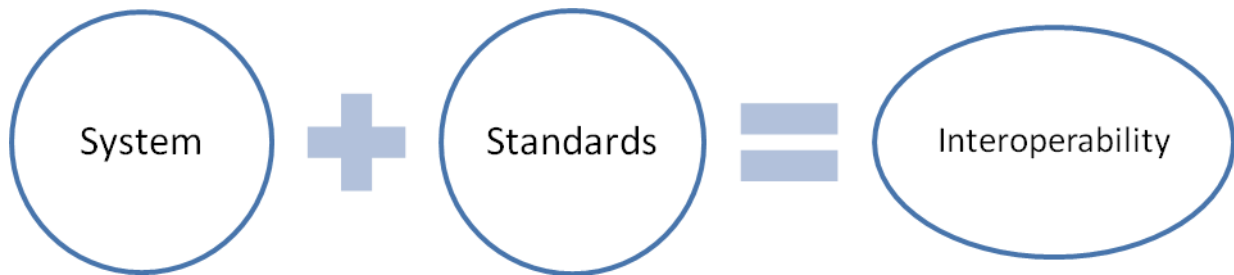
66 All 16 services have access to IT support, and in most cases support was rated good, although this was qualified in some cases:

‘Very good supporting what they know, i.e. Basic stuff.’ SMR/HER service.

67 Only Edinburgh and the Western Isles do not have access to a network and because of this, neither of the two services has access to a network back-up routine, something available to all the others. As Edinburgh and the Western Isles both use HBSMR, a commercial database produced specifically for the Historic Environment sector, and they both have access to the Internet, their core data is backed up online. However, all other data on their systems relies on it being backed up onto a portable external hard drive.

Interoperability

68 For interoperability to be possible to ‘combine spatial data from different sources ... and share them between several users,’ (European Commission 2007, L 108/1 para 6) two components required are an interoperable system and interoperability standards



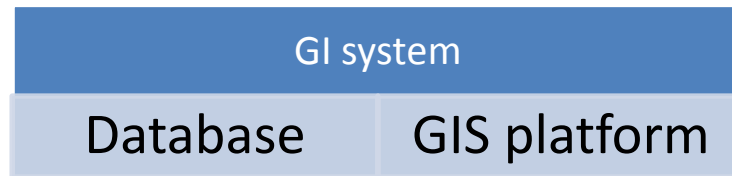
Systems

69 Technology is becoming ever more demanding and many of the local services have decided to use commercially available software, aimed at the Historic Environment community, to enable them to meet industry standards (Appendix 6, Table 14). Some services have local IT developers that enable them to design their own bespoke IT solutions while others are obliged to use local corporate software and systems.

70 The costs of technology is a substantial burden on the local Historic Environment services; some spending a significant proportion of their budget on it (Appendix 6, Table 3). Even those with corporate IT find themselves having to prioritise developments from year to year meaning that some initiatives never become a high enough priority to be developed.

71 The IT costs of providing local Historic Environment services have increased exponentially since Baker (Baker 1999). All the services use information technology. Almost all identified some form of software, hardware or data storage upgrade as being an IT priority (Appendix 6, Table 6 & 7). Many have one or more annual software licence payments and a significant number have paid for a software technician to assist in data migration from one database to another. There are costs related to IT support, data storage and website development. Once all this is paid for there are the additional training costs.

- 72 The systems used and developed by the local services are generally a database with a GIS platform. This is the minimum requirement for a Geographic Information system to be interoperable.



Database

- 73 A minimum requirement for the delivery of any GI service is a data set containing data and the location of that data in the form of a grid reference. With a grid reference, the data can plot itself automatically in a GIS system.
- 74 All but Falkirk SMR have an interoperable data set in the form of a database. Falkirk has a database but it does not contain the fields required for a grid reference to be entered. The database does contain spatial data but this is stored in a free text field rather than X and Y coordinate fields.

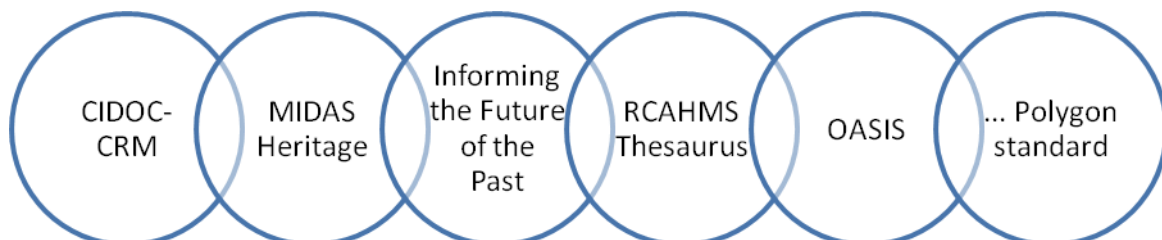
GIS Platform

- 75 The second requirement for an interoperable service is GIS software. Being able to plot point data based on grid references and the need to create, modify and view the many defined areas or polygons created by a variety of organisations requires a GIS system (Middleton 2009a).
- 76 Only Orkney and Stirling do not have GIS software. Stirling does have access to a well-developed corporate GIS intranet (internal council system) and access to a technician who can add, modify or update polygons onto the intranet system if required.

Standards

- 77 *INSPIRE*, *Place Matters* and *One Scotland* repeat many times the need for standards. *INSPIRE* requires that, '[it] should be ... possible to combine spatial data from different sources ... and share them between several users.' *Place Matters* says, '[data should be] collected once to universally accepted standards ... [data should be] easy to share and integrate ... [and] referenced to a definitive information framework which supports its seamless combination'.
- 78 For data to achieve this, data sets must hold comparable information in a data structure that can be joined.
- 79 Data standards for the Historic Environment are well developed. International standard ISO 21127:2006, the CIDOC Conceptual Reference Model (CRM) which 'provides definitions and a formal structure for describing the implicit and explicit concepts and relationships used in cultural heritage documentation,' has been in place since December 2006. (ICOM 2009)

- 80 The interpretation of the CIDOC-CRM, for the Historic Environment sector, exists in the form of MIDAS Heritage: 'MIDAS sets out an agreed list of the items or 'units' of information that should be included in an inventory or other systematic record of the historic environment.' (FISH 2009)
- 81 ALGAO's Historic Environment Record manual, *Informing the Future of the Past II* (Gilman and Newman (eds.) 2007) provides comprehensive guidance for SMRs and HERs.



Standards for Historic Environment data are well developed

- 82 Many thesauri and word lists exist to structure the content of the data and the terms used within the databases. These include the RCAHMS Thesaurus of monument types, the Association of Local Government Archaeological Officers (ALGAO) Events⁵ table and the INSCRIPTION terminology word lists (FISH 2004). For a comprehensive list refer to Gilman & Newman 2007.
- 83 A Scottish standard for the creation of Historic Environment polygons will be produced during the summer of 2009 (Middleton 2009c in prep).
- 84 OASIS (Online AccesS to the Index of archaeological investigationS) has been developed to structure the ingest of data produced by third parties as a result of fieldwork and survey, into local and national databases.
- 85 Ten of the local services are MIDAS compliant and two are actively working towards it. Most use a thesaurus and OASIS is a standard requirement in many briefs sent out to fieldworkers. A more detailed summary is available in *Delivering Efficient Data Management: Local Authority Archaeological Liaison* (Casey 2009).

Discovery mechanism

- 86 *Place Matters* is the closest to being prescriptive in defining how data should be 'easy to discover.' It states: 'Each public sector organisation should make publicly available the details of its location related datasets – even if the dataset itself is not publicly accessible or is not free of charge.' Continuing, '[Data should be] easy to discover, and with clear terms for its use ... simple to access and easy to share and integrate.'
- 87 Emphasising this *INSPIRE* says 'spatial data [should be] made available under conditions which do not unduly restrict their extensive use ... it [should be] easy to discover available spatial data, to evaluate their suitability for the purpose and to know the conditions applicable to their use.'
- 88 *INSPIRE* and *Place Matters* are specifically referring to Metadata (data that describes data and aids discovery). Metadata Standards are something Defra will be reviewing as part of the

implementation of *INSPIRE*, with European guidance becoming available in December 2008. (European Commission 2008)

- 89 Nationally, the Glgateway is a free web service aimed at increasing awareness of, and access to, geospatial information in the UK and offers assistance and guidance on the collection of metadata to national and international standards. (Glgateway 2009)
- 90 As with standards, the Historic Environment sector is relatively advanced in this area. HEIRNET (Historic Environment Information Resources Network) - a consortium of Historic Environment professionals with an interest in information systems - has maintained, for some years, a register of Historic Environment resources and is currently developing a register of Historic Environment web services (hosted by the Archaeological Data Service (ADS) in York). Only Edinburgh, North Lanarkshire, Dundee City and East Dumbartonshire are not listed on HEIRNET. Of those that are listed only Highland and Stirling have updated their record since 2003.
- 91 As part of their ARENA2 project, the Archaeology Data Service are proposing to develop an UDDI (Universal Description, Discovery, and Integration) registry indexing available Historic Environment web services. (McKeague pers comm)

Delivery mechanism

- 92 *One Scotland, One Geography* says, 'data should be created once and used many times.' *INSPIRE* that it, 'should be ... possible for spatial data collected at one level ... to be shared between other[s]...' and *Place Matters* goes on that data should be, 'used many times by the public and private sector.'
- 93 There are many websites in Scotland providing access to Historic Environment data. PASTMAP allows the user to view data produced by Historic Scotland, RCAHMS and many of the Scottish SMRs and HERs.
- 94 HLAMAP⁶ allows the user to view the Historic Land-use data produced by RCAHMS and HS and Canmore⁷ gives the user access to the RCAHMS database.
- 95 Access to all the SMR or HER records for eight of the local authority services is available via local authority or Trust web sites.⁸
- 96 But, for data to be used, the user must be able to do more than just view it. To properly use data one must be able to interact with it. The use of Historic Environment data by non professionals was raised as a concern by a number of local Historic Environment services and it is an issue explored in more detail in *Polygonisation*, (Middleton 2009, para. 166-171).
- 97 Historic Scotland is the only organisation to maintain a register of the GI data they create and their data is listed and downloadable from their website.⁹
- 98 RCAHMS has developed Web Map Services for the Canmore and Scottish Borders Council point data sets¹⁰. These are currently in beta testing and wider release will follow in due course.
- 99 Some local services are already using web services technology. Stirling Council SMR views its own data using web services and a web GIS viewer provided by Forth Valley GIS.¹¹ The WoSAS

and the Highland Council HER both make their data available as a web services consumed by Council websites that display their data using online GIS viewers.

100 Data is also available from all of the local services by email, on CD or on paper on request. No local authority charges for the data but many do charge for the time it takes to prepare the download.

101 There is no formal mechanism to prompt users to refresh downloaded data with the onus on the user to make sure they have the most up-to-date information. This has led to a general unease across the Historic Environment curatorial sector about the re-use of out-of-date downloads.

Part 3: Summary and Conclusion

Summary

- 102 There have been extraordinary technological advances made by the Historic Environment community since the Baker report (Baker 1999). Entire new systems have emerged for the management and curation of Historic Environment data; technology has advanced a pace; the web has become ubiquitous, and local authority Historic Environment curators have had to become technically aware of database technology, GIS and geographic capabilities and the serving up of data online. But, while the technology has changed, the basic services the local authority curators provide remains very similar. (Casey 2009)
- 103 The SMRs/HERs are spread across a range of local government departments from planning to museums with services hosted within Council departments or contracted out to commercial contractors or Trusts (Appendix 1). The only common thread is the provision of development control advice to planning departments.
- 104 This model for the delivery of services locally seems to be relatively stable. Although there may be changes in service provider, the sector as a whole has become well established and an accepted part of the development process.
- 105 But, this model has its problems. The local services have had extremely limited resourcing, they are spread between different Council departments and all have different remits. Any move toward increased cooperation between local and national services must start by understanding these limitations and the constraints budget and local policy place on local services.
- 106 The vision of Geographic Information policy is to deliver government efficiency by streamlining the delivery of services. The model is one where information is created, curated and served up at the most effective level of government then shared through joined systems to be used many times by the public and the private sectors.
- 107 The European Union *INSPIRE* directive is to be transposed into UK legislation in September 2009. A joint Scottish Historic Environment dataset will need to be in place by September 2011 if it is to be included under *INSPIRE's* Annex I, Protected sites.
- 108 *INSPIRE's* Protected sites includes archaeological and historic sites.
- 109 A joint Scottish Historic Environment dataset will include data supplied nationally by HS for designated sites and by RCAHMS and locally by the SMRs and HERs for undesignated sites.
- 110 Local authorities are yet to adopt Geographic Information policy in line with *INSPIRE, Place Matters* and *One Scotland, One Geography*. However, some Geographic Information specialists did identify the Historic Environment as a data set of national rather than just local interest.
- 111 Policy is the most significant barrier preventing data sharing. Policy in the form of service level agreements will be required nationally, locally and within and between organisations to remove barriers to data sharing.

112 All but two of the local Historic Environment services have the hardware and software that enable a system to be interoperable.

113 While most local Historic Environment services have the equipment to deliver interoperable services many do not have the funding to create and maintain interoperable data.

114 With the production of draft standards for polygonisation expected this summer (2009), all the standards required to deliver a joint Scottish Historic Environment data set are in place.

115 Ten of the 16 local Historic Environment services can already deliver data that meet the agreed standards for interoperability and two are working toward this.

116 HEIRNET provides the Historic Environment with a resource discovery mechanism and all but three of the services providers are registered on it.

117 GI data is available from all the local services on request. Eight of the services host their entire SMR online and three are already using web services (the tool most likely to be used to deliver data between organisations in the future) to feed their web sites.

Conclusion

- 118 The Historic Environment sector is well placed to deliver a joint Scottish Historic Environment data set. Interoperability systems require little to be universally adequate. Standards are mostly in place. A discovery mechanism for the Historic Environment community has been in place for many years and it will take very little to persuade the final few to sign up. Local services can provide their GI data on request. Work to finalise the adoption of standards and to lobby for and develop policy at all levels of government remain the final hurdles. It will not be easy and it 'will require clear top management leadership and strong, authoritative and cross-cutting governance.' (UK Geographic Information Panel 2008, p 24, para 58). If policy can be delivered, it will provide the sector with a robust foundation from which to build and it will revolutionise how Historic Environment data is delivered and used right across government and the private sector.
- 119 To implement such dramatic cross-government initiatives (e.g. *INSPIRE*, *Place Matters* and *One Scotland, One Geography*) a pilot is almost certain to be required. If policy can be developed, the relatively small scale of the Historic Environment sector, the small number of local services and the advanced position the sector is in as regards standards and systems, may put a joint Scottish Historic Environment data set in a strong position to lead the way.
- 120 The sector has done well to reach this position considering that the local services have had extremely limited resourcing. The *Delivering Efficient Data Management* report (Casey 2009) highlights the way local services are set up differently across the country. They are in different Council departments and all have different remits. This report highlights the difficulties that local services have in developing and maintaining their IT systems. The *Polygonisation* report (Middleton 2009) highlights some of the issues curators face in resourcing and maintaining comprehensive, up to date, local data sets. These reports together highlight the potential conflict that the local services have in providing both the services that their local authorities require and a consistent data set that meets national standards.
- 121 The sector is small in terms of staffing, despite meeting a significant demand for services. The advantage of the small size of the sector means that relationships between organisations (at a local and national level) are strong and this could lead to opportunities for collaboration and efficiency savings in the future.

Notes

¹ In co operation with the Institute of Historic Building Conservation (IHBC), National Museums of Scotland (NMS) and the Scottish Museums Council (SMC)

² PASTMAP <http://www.pastmap.org.uk> [Accessed 4th March 2009]

³ Cameron Easton

⁴ Between October 2008 and February 2009.

⁵ Events: A single survey collecting Historic Environment data that can be mapped to a specific location.

⁶ HLAMAP <http://jura.rcahms.gov.uk/HLA/start.jsp> [Accessed 4th March 2009]

⁷ Canmore <http://canmore.rcahms.gov.uk/en/advanced/> [Accessed 12th March 2009]

⁸ Aberdeenshire, Highland, Orkney, Perth & Kinross, Stirling & Clackmannanshire, Western Isles and WoSAS.

⁹ HS, GIS downloader <http://hsewsf.sedsh.gov.uk> [Accessed 4th March 2009]

¹⁰ The Scottish Borders Council Historic Environment Record is hosted by RCAHMS.

¹¹ The trading name of a GIS contractor

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Communities and Local Government Publications

Appendix 1: Local Authority Archaeological Services as of February 2009.

Unitary Local Authority (ULA)	HE Service provider (Feb 2009)	Name of service	HE Record type	Record ownership	Local Authority departments served
Aberdeen City Council	Aberdeen City Council	Aberdeen City Council Archaeological Unit	SMR	Unitary Local Authority (ULA)	<ul style="list-style-type: none"> • Neighbourhood services • Museums and galleries
Aberdeenshire Council	Aberdeenshire Council	Aberdeenshire Council Archaeology Service	SMR	ULA	<ul style="list-style-type: none"> • Planning & Environmental Services
Angus Council	Aberdeenshire Council	Aberdeenshire Council Archaeology Service	SMR	ULA	<ul style="list-style-type: none"> • Planning & Environmental Services
Argyll and Bute Council	West of Scotland Archaeology Service	West of Scotland Archaeology Service	SMR	ULA	<ul style="list-style-type: none"> • Planning
Clackmannanshire Council	Stirling Council	Stirling and Clackmannanshire SMR	SMR	ULA	<ul style="list-style-type: none"> • Environment Service
Dumfries and Galloway Council	Dumfries and Galloway Council	Dumfries and Galloway SMR	SMR	ULA	<ul style="list-style-type: none"> • Planning and Environment
Dundee City Council	Rathmell Archaeology Ltd	Dundee Historic Environment Record	HER	ULA	<ul style="list-style-type: none"> • Planning • Museums
East Ayrshire Council	West of Scotland Archaeology Service	West of Scotland Archaeology Service	SMR	ULA	<ul style="list-style-type: none"> • Planning
East Dunbartonshire Council	Rathmell Archaeology Ltd	East Dunbartonshire SMR	SMR	ULA	<ul style="list-style-type: none"> • Planning
East Lothian District Council	East Lothian District Council	East Lothian Council Archaeology Service	SMR	ULA	<ul style="list-style-type: none"> • Culture and Community Development within Community Services
East Renfrewshire Council	West of Scotland Archaeology Service	West of Scotland Archaeology Service	SMR	ULA	<ul style="list-style-type: none"> • Planning
Edinburgh City Council	Edinburgh City Council	City of Edinburgh Council Archaeology Service	SMR	ULA	<ul style="list-style-type: none"> • Culture and Sport within Corporate Services.
Falkirk Council	Falkirk Council	Falkirk Council SMR	SMR	ULA	<ul style="list-style-type: none"> • Falkirk Museum
Fife Council	Fife Council	Sites and Monuments Record – Fife Archaeological Unit	SMR	ULA	<ul style="list-style-type: none"> • Development Services within Physical Regeneration Environment Projects
Glasgow City Council	West of Scotland Archaeology Service	West of Scotland Archaeology Service	SMR	ULA	<ul style="list-style-type: none"> • Development & Regeneration Services (planning)
Highland Council	Highland Council	Highland Historic Environment Record	HER	ULA	<ul style="list-style-type: none"> • Environment & Development within Planning and Development Service

Inverclyde Council	West of Scotland Archaeology Service	West of Scotland Archaeology Service	SMR	ULA	<ul style="list-style-type: none"> • Planning
Midlothian Council	East Lothian District Council	East Lothian Council Archaeology Service	SMR	ULA	<ul style="list-style-type: none"> • Culture and Community Development within Community Services
Moray Council	Aberdeenshire Council	Aberdeenshire Council Archaeology Service	SMR	ULA	<ul style="list-style-type: none"> • Planning & Environmental Services
North Ayrshire Council	West of Scotland Archaeology Service	West of Scotland Archaeology Service	SMR	ULA	<ul style="list-style-type: none"> • Planning
North Lanarkshire Council	As of April 2009 North Lanarkshire Built Heritage and Design Team	As of April 2009 North Lanarkshire Built Heritage and Design Team	SMR	ULA	<ul style="list-style-type: none"> • Planning
Orkney Islands Council	Orkney Islands Council	Orkney Council Archaeology Service	SMR	ULA	<ul style="list-style-type: none"> • Planning
Perth and Kinross Council	Perth and Kinross Heritage Trust	Perth and Kinross Historic Environment Record	HER	Perth and Kinross Heritage Trust	<ul style="list-style-type: none"> • Environment Service
Renfrewshire Council	West of Scotland Archaeology Service	West of Scotland Archaeology Service	SMR	ULA	<ul style="list-style-type: none"> • Planning
Scottish Borders Council	Scottish Borders Council	Scottish Borders Historic Environment Record	HER	ULA	<ul style="list-style-type: none"> • Planning and Economic Development
Shetland Islands Council	Shetland Amenity Trust	Archaeology Section, Shetland Amenity Trust/ Shetland SMR	SMR	Shetland Amenity Trust	<ul style="list-style-type: none"> • Planning
South Ayrshire Council	West of Scotland Archaeology Service	West of Scotland Archaeology Service	SMR	ULA	<ul style="list-style-type: none"> • Planning
South Lanarkshire Council	West of Scotland Archaeology Service	West of Scotland Archaeology Service	SMR	ULA	<ul style="list-style-type: none"> • Planning
Stirling Council	Stirling Council	Stirling and Clackmannanshire SMR	SMR	ULA	<ul style="list-style-type: none"> • Environment Service
West Dunbartonshire Council	West of Scotland Archaeology Service	West of Scotland Archaeology Service	SMR	ULA	<ul style="list-style-type: none"> • Planning
West Lothian Council	West of Scotland Archaeology Service	West of Scotland Archaeology Service	SMR	ULA	<ul style="list-style-type: none"> • Planning
Western Isles Council	Western Isles Council	Western Isles Archaeology Service	SMR	ULA	<ul style="list-style-type: none"> • Social and Community Services • Development • Technical Services • Education

Appendix 2: Geographic Information Stakeholders

Governmental: Local (SMR/HER)		
Organisation	Area of Responsibility	Contact
Aberdeen City Council Archaeological Unit	Keeper, Archaeology	Judith Stones
Aberdeenshire Council Archaeology Service	Archaeologist	Bruce Mann
City of Edinburgh Council Archaeology Service	Curator of Archaeology	John Lawson
Dumfries and Galloway SMR	SMR Officer	Andrew Nicholson
Dundee Historic Environment Record	Director: Rathmell Archaeology Ltd	Thomas Rees
East Dunbartonshire SMR	Director: Rathmell Archaeology Ltd	Thomas Rees
East Lothian Council Archaeology Service	Heritage Officer (1) Historic Environment Officer (2)	Biddy Simpson (1) Stephanie Leith (2)
Falkirk Council SMR	Keeper, Archaeology & local History	Dr Geoff Bailey
Fife Archaeological Unit	Archaeologist	Douglas Spiers
Highland Historic Environment Record	HER Officer	Sylvina Tilbury
Orkney Council Archaeology Service	Council Archaeologist for Orkney	Julie Gibson
Perth and Kinross Historic Environment Record	Heritage Officer	Sarah Winlow
Scottish Borders Historic Environment Record	Archaeology Officer	Dr Christopher Bowles
Shetland SMR	Regional Archaeologist, Shetland	Val Turner
Stirling and Clackmannanshire SMR	Archaeology Officer	Lorna Main
West of Scotland Archaeology Service	WoSAS Manager	Dr Carol Swanson
Western Isles Archaeology Service	Western Isles Archaeologist	Dr Mary Macleod

Governmental Local (GI)		
Organisation	Area of Responsibility	Contact
Aberdeen City Council	Corporate GIS Administrator	Iain Patterson
Aberdeenshire Council	ICT Team Leader	Chris Clelland
City of Edinburgh Council	GI systems co-ordinator	Mike Steven
Dumfries and Galloway Council	GIS officer	Barry Young
East Lothian Council	Information Systems and Data Custodian	Gordon Norrie
Fife Council	GIS development Officer	Ken Campbell
Highland Council	GIS Manager	Jon Shepherd
Orkney Island Council,	Data Management Technician	Kenny Swinney
Perth and Kinross Council	Principle GIS Engineer	Ewan Walker
Shetland Island Council	Technical Officer ,Heritage Services	John Carolan
Stirling Council	Web Services Team Leader	Yvonne Dickson
West of Scotland Archaeology Service (GI service provided by South Ayrshire Council)	ICT Project Leader	Stuart McCall

Governmental National (GI)		
Organisation	Job Title and Area of Responsibility	Contact
Historic Scotland (HS)	GIS Manager	James Steel
RCAHMS	GIS Projects Manager	Alistair Wilkie
Forestry Commission	GIS and Technical Development Manager	Howard Davies
Scottish Government	GI lead, Modernising Government, Government Efficiency	Cameron Easton
National Parks	Loch Lomond Senior GIS / Data technician	Sally Newton
English Heritage (EH)	Datasets Development Manager	Martin Newman (NMR)

Appendix 3: Project board and acknowledgements

Project Board

Mairi Davies	Historic Scotland
The late Ian Shepherd	Chair, SMR Forum
Bruce Mann	Chair, SMR Technical Working Group
Rebecca Jones	RCAHMS
Peter McKeague	RCAHMS

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Appendix 4: Reports using the local authority questionnaire results.

Casey, S 2009

- *Delivering Efficient Data Management: Local Authority Archaeological Liaison*
RCAHMS report

Middleton, M 2009a

- *Polygonisation: The Shape of Things to Come: What are needs for Scottish polygonised Historic Environment data?*
Joint ALGAO Scotland HER Forum, HS & RCAHMS report

Middleton, M 2009b

- *Inspired! An assessment of the IT capabilities of the Scottish Sites and Monuments Records.*
Joint ALGAO Scotland HER Forum, HS & RCAHMS report

Middleton, M 2009c (in prep)

- *A Historic Environment Polygonisation Standard (Scotland).*
Joint ALGAO Scotland HER Forum, HS & RCAHMS Standard

Appendix 5: INSPIRE annexes.

Annex I	Annex II	Annex III
<ol style="list-style-type: none"> 1. Coordinate reference systems 2. Geographical grid systems 3. Geographical names 4. Administrative units 5. Addresses 6. Cadastral parcels 7. Transport networks 8. Hydrography 9. Protected sites 	<ol style="list-style-type: none"> 1. Elevation 2. Land cover 3. Ortho-imagery 4. Geology 	<ol style="list-style-type: none"> 1. Statistical units 2. Buildings 3. Soil 4. Land use 5. Human health and safety 6. Utility and governmental services 7. Environmental monitoring facilities 8. Production and industrial facilities 9. Agricultural and aquaculture facilities 10. Population distribution – demography 11. Area management/ restriction/regulation zones & reporting units 12. Natural risk zones 13. Atmospheric conditions 14. Meteorological geographical features 15. Oceanographic geographical features 16. Sea regions 17. Bio-geographical regions 18. Habitats and biotopes 19. Species distribution 20. Energy Resources 21. Mineral resources
<p>Note: The specifications are less stringent for Annex III</p>		

Source: European Commission 2007

Appendix 6: Local authority questionnaire results.

A database containing results of the local authority questionnaire is available to the local authority Historic Environment services on request by email to Mike.Middleton@rcahms.gov.uk.

Table 1:
Have you ever been moved between local authority departments?

	Y	N
Aberdeen City	x	
Aberdeenshire, Angus and Moray		x
Dumfries and Galloway		x
East and Mid Lothian		x
Edinburgh	x	
Falkirk		x
Fife		x
Highland	x	
Orkney	x	
Perth and Kinross	x	
Rathmell Archaeology Ltd		x
Scottish Borders		x
Shetland		n/a
Stirling and Clackmannan		x
Western Isles	x	
WoSAS		x

Table 2:
Is your service hosted on a network?

	Y	N
Aberdeen City	x	
Aberdeenshire, Angus and Moray	x	
Dumfries and Galloway	x	
East and Mid Lothian	x	
Edinburgh		x
Falkirk	x	
Fife	x	
Highland	x	
Orkney	x	
Perth and Kinross	x	
Rathmell Archaeology Ltd	x	
Scottish Borders	x	
Shetland	x	
Stirling and Clackmannan	x	
Western Isles		x
WoSAS	x	

Table 3:
What percentage of your total budget do you put toward IT?

	% of budget put toward IT	IT costs absorbed at the service level
Aberdeen City		x
Aberdeenshire, Angus and Moray		x
Dumfries and Galloway	7-8%	
East and Mid Lothian	40%	
Edinburgh	< 10%	
Falkirk		x
Fife	10%	
Highland	≈ 50%	
Orkney		x
Perth and Kinross	25%	
Rathmell Archaeology Ltd		x
Scottish Borders		x
Shetland		x
Stirling and Clackmannan		x
Western Isles	Almost all	
WoSAS	c 5%	

Table 4: Are you aware of the INSPIRE Directive?			
	Y	N	Thoughts (edited)
Aberdeen City	x		Positive
Aberdeenshire, Angus and Moray	x		It appears to be a good idea ...
Dumfries and Galloway	x		Sensible (inevitable)
East and Mid Lothian		x	Sounds like a good idea.
Edinburgh	x		It is a good idea in principle.
Falkirk	x		Difficult to achieve on a limited budget ...
Fife	x		Excellent piece of high level theoretical thinking ...
Highland	x		... it is a valuable initiative ...
Orkney	x		I aspire to INSPIRE
Perth and Kinross		x	... In principle agreement with the directive ...
Rathmell Archaeology Ltd	x		n/a
Scottish Borders		x	n/a
Shetland		x	n/a
Stirling and Clackmannan		x	Sounds interesting ...
Western Isles	x		n/a
WoSAS		x	n/a

Table 5: Are you aware of One Scotland - One Geography?			
	Y	N	Thoughts (edited)
Aberdeen City	x		Positive
Aberdeenshire, Angus and Moray	x		Fully support the concept ...
Dumfries and Galloway	x		It is on the right lines.
East and Mid Lothian	x		n/a
Edinburgh		x	It is a good idea in principle.
Falkirk		x	n/a
Fife	x		Excellent piece of high level theoretical thinking ...
Highland	x		This is a very useful initiative which is already producing real results.
Orkney	x		Sounds interesting if implemented.
Perth and Kinross		x	Embodies good ideas, common sense ...
Rathmell Archaeology Ltd	x		Awaiting guidance and instructions.
Scottish Borders		n/a	It is good within the local services ...
Shetland		x	Our priority is to link the various Shetland databases ...
Stirling and Clackmannan		x	None
Western Isles		x	n/a
WoSAS	x		... no difficulty with the principles ...

Table 6:
What is your services strategy for the delivery of polygonised data via web map services?

	None	Implemented
Aberdeen City	x	
Aberdeenshire, Angus and Moray	x	
Dumfries and Galloway		x (for in house and web use)
East and Mid Lothian	x	
Edinburgh	x	
Falkirk	x	
Fife	x	
Highland		x (for in house and web use)
Orkney	x	
Perth and Kinross	x	
Rathmell Archaeology Ltd	x	
Scottish Borders		
Shetland	n/a	
Stirling and Clackmannan		x
Western Isles	x	
WoSAS		x (for in house and web use)

Table 7:
How do you see your IT capabilities developing?

	1 Year	3 Years	5 Years
Aberdeen City	Software upgrade (GIS)	<ul style="list-style-type: none"> Data Storage Hardware upgrade 	Interoperability with Museums and Collections
Aberdeenshire, Angus and Moray	Software upgrade (db)		
Dumfries and Galloway	Interoperability with Museum (poss)	Website development	
East and Mid Lothian	Status quo	SMR online	
Edinburgh	<ul style="list-style-type: none"> More staff (Data enhancement) Website development publicly available service 		
Falkirk	n/a		
Fife	Status Quo		
Highland	Status quo	<ul style="list-style-type: none"> Data Storage Hardware upgrade 	
Orkney	Software purchase (GIS)		
Perth and Kinross	Interoperability with Conservation Section	Website enhancement	
Rathmell Archaeology Ltd	n/a		
Scottish Borders	Data enhancement	Software upgrade (db)	
Shetland	Status quo		
Stirling and Clackmannan	PASTMAP		
Western Isles	Data enhancement	Software upgrade (db)	Maintain Website
WoSAS	Software upgrade (GIS)	Website enhancement	

Table 8:
What are your main IT priorities for your service?

Responses			Status quo	Software maintenance/upgrade	Hardware maintenance/upgrade	Website maintenance/upgrade	Digital storage	Data enhancement	Improved efficiency	Interoperability
Aberdeen City	Data storage	equipment upgrade			x		x			
Aberdeenshire, Angus and Moray	Database upgrade	MIDAS compliance		x						x
Dumfries and Galloway	Improved data Provision							x		
East and Mid Lothian	Software costs			x						
Edinburgh	Status quo		x							
Falkirk	Status quo		x							
Fife	Using IT to improve efficiency								x	
Highland	Data storage	Equipment upgrade	Network speed		x		x			
Orkney	Purchasing GIS			x						
Perth and Kinross	Interoperability with PKC Conservation Section	Database enhancement						x		x
Rathmell Archaeology Ltd	N/A		x							
Scottish Borders	Developing GIS							x		
Shetland	Web site development	Database enhancement				x		x		
Stirling and Clackmannan	Web site development					x				
Western Isles	Status quo		x							
WoSAS	Software upgrade (now done)	Hardware upgrade(now done)		x	x					

Table 9: Do you currently have any database or GIS issues that make it harder for you to deliver your service?		
	Issues	No issue
Aberdeen City	Move from GGP to ArcGIS	
Aberdeenshire, Angus and Moray	<ul style="list-style-type: none"> • Old db software (Access 97) • GIS glitch with GGP • database upgrade 	
Dumfries and Galloway		x
East and Mid Lothian	IT support for GI	
Edinburgh	Lack of network	
Falkirk		x
Fife	Training	
Highland	Very slow network	
Orkney	No GIS	
Perth and Kinross		x
Rathmell Archaeology Ltd		x
Scottish Borders		x
Shetland	Single seat GIS license for entire trust (No access to appropriate OS mapping) △	
Stirling and Clackmannan	No budget to develop GIS web service	
Western Isles		x
WoSAS		x

△Identified by Historic Scotland. Since April 2009 this should be resolved as under the One Scotland Mapping Agreement . By signing a contractor’s licence with Shetland Islands council, the Trust can use any OS mapping held by the council.

Table 10: What network operating system do you use?				
	Novell	Windows	No server	Don't know
Aberdeen City	x			
Aberdeenshire, Angus and Moray	x			
Dumfries and Galloway		x		
East and Mid Lothian				x
Edinburgh			x	
Falkirk				x
Fife	x			
Highland		x		
Orkney	x			
Perth and Kinross		x		
Rathmell Archaeology Ltd		x		
Scottish Borders		x		
Shetland		x		
Stirling and Clackmannan	x			
Western Isles			x	
WoSAS		x		

Table 11: Do you have access to IT support?			
	Y	N	
Aberdeen City	x		Very poor - understaffing
Aberdeenshire, Angus and Moray	x		Very good
Dumfries and Galloway	x		Ok – much improved
East and Mid Lothian	x		Major problems if IT officer leaves. There is only 1
Edinburgh	x		Very good supporting basic requirements.
Falkirk	x		OK (Forth Valley GIS for the GIS and in house for the IT)
Fife	x		Good
Highland	x		
Orkney	x		Good
Perth and Kinross	x		DM HBSMR support excellent. Council support IST: Ok
Rathmell Archaeology Ltd	x		Good
Scottish Borders	x		Very good
Shetland	x		Variable
Stirling and Clackmannan	x		Very responsive
Western Isles	x		Exegesis support – very responsive. Council support – very overloaded
WoSAS	x		Host authority support could be improved, GIS web support from another council member Council excellent

Table 12: What system do you have in place to back up your data?			
	Corporate backup	External server	Portable external drive
Aberdeen City	x		
Aberdeenshire, Angus and Moray	x		
Dumfries and Galloway	x		
East and Mid Lothian	x		
Edinburgh			x
Falkirk	x		
Fife	x		
Highland	x		
Orkney	x		
Perth and Kinross	x		
Rathmell Archaeology Ltd		x	
Scottish Borders	x		
Shetland	x		
Stirling and Clackmannan	x		
Western Isles			x
WoSAS	x		

Table 13: Can web services and web map services be implemented on your database/GIS?			
	Y	N	Don't know
Aberdeen City			x
Aberdeenshire, Angus and Moray	x		
Dumfries and Galloway	x		
East and Mid Lothian			x
Edinburgh		x	
Falkirk		x	
Fife		x	
Highland	x		
Orkney			n/a
Perth and Kinross			x
Rathmell Archaeology Ltd			x
Scottish Borders	x		
Shetland			x
Stirling and Clackmannan	x		
Western Isles			x
WoSAS	x		

Table 14:
What software do you use to run your service?

	GIS	Database
Aberdeen City	Old: GGP New: ArcGIS	Access 2003
Aberdeenshire, Angus and Moray	GGP 2006 v3.0.2.15	Access 97
Dumfries and Galloway	MapInfo v8.5	HBSMR v3.5 Oracle 10g client.
East and Mid Lothian	ArcGIS 9.2	HBSMR v. 3.55
Edinburgh	ArcGIS 9.0	HBSMR Access 2000
Falkirk	ArcGIS	Vernon CMS
Fife	ArcGIS 9.3	HBSMR
Highland	ArcGIS 9.1	HBSMR v3.57 Access 2002
Orkney	None	Don't know
Perth and Kinross	ArcGIS 9.1	HBSMR V3.57
Rathmell Archaeology Ltd	ArcGIS 9.2	HBSMR
Scottish Borders	ArcGIS 9.2	Oracle at RCAHMS
Shetland	Arc View 9	HBSMR
Stirling and Clackmannan	None	MS SQL Server 2000
Western Isles	MapInfo 8.5	HBSMR v 3
WoSAS	ArcGIS 9.3	Access 2003

Table 15:
Is your SMR database integrated with your GIS software?

	Y	N	
Aberdeen City	x		
Aberdeenshire, Angus and Moray	x		
Dumfries and Galloway	x		But only for point data and events polygons
East and Mid Lothian	x		
Edinburgh	x		
Falkirk		x	
Fife	x		
Highland	x		
Orkney		x	
Perth and Kinross	x		
Rathmell Archaeology Ltd	x		
Scottish Borders		x	
Shetland	x		
Stirling and Clackmannan	x		
Western Isles	x		
WoSAS	x		Changes to the database are reflected in the GIS, but this connection does not operate in the other direction.

Table 16:
Do you provide your data in an XML format?

	Y	N	Don't know
Aberdeen City		x	
Aberdeenshire, Angus and Moray		x	
Dumfries and Galloway		x△	
East and Mid Lothian		x△	
Edinburgh			x△
Falkirk		x	
Fife	x (but never do)		
Highland	x		
Orkney		x	
Perth and Kinross			n/a△
Rathmell Archaeology Ltd		x△	
Scottish Borders		x	
Shetland		x△	
Stirling and Clackmannan		x	
Western Isles	x		
WoSAS	x		

△ Could provide XML (HBSMR users)

Table 17:
Do you currently have a webpage for every SMR record?

	Y	N
Aberdeen City		x
Aberdeenshire, Angus and Moray	x	
Dumfries and Galloway		x
East and Mid Lothian		x
Edinburgh		x
Falkirk		x
Fife		x
Highland	x	
Orkney	x	
Perth and Kinross	x○	
Rathmell Archaeology Ltd		x
Scottish Borders	x△	
Shetland		x
Stirling and Clackmannan	x	
Western Isles	x	
WoSAS	x	

○ Updated every 6 months

△ Not publicly available

Table 18:
How do you supply data to third parties?

	Website	email	CD	Provide access: Users can visit and take what they need
Aberdeen City		x	x	
Aberdeenshire, Angus and Moray		x	x	
Dumfries and Galloway		x	x	
East and Mid Lothian		x	x	
Edinburgh				x
Falkirk		x		
Fife		x	x	
Highland	x	x	x	
Orkney				x
Perth and Kinross		x	x	
Rathmell Archaeology Ltd		x	x	
Scottish Borders		x	x	
Shetland		x		
Stirling and Clackmannan		x		
Western Isles		x	x	
WoSAS	x	x	x	

Table 19:
HEIRNET register

	Date record registered	Date of most recent update
Aberdeen City	2002	
Aberdeenshire, Angus and Moray	2002	2003
Dumfries and Galloway	2002	
East and Mid Lothian	2009	
Edinburgh		
Falkirk	2002	
Fife	2002	
Highland	2002	2009
Orkney	2002	2003
Perth and Kinross	2002	
Rathmell Archaeology Ltd		
Scottish Borders	2002	
Shetland	2002	
Stirling and Clackmannan	2002	2009
Western Isles	2002	
WoSAS	2002	

Table 20:
Have you heard of HEIRNET web service registry?

	Y/N	Do you have plans to join?
Aberdeen City	Y	N
Aberdeenshire, Angus and Moray	Y	N
Dumfries and Galloway	Y	Y
East and Mid Lothian	Y	N/A
Edinburgh	Y	N
Falkirk	Y	N
Fife	N	N
Highland	Y	Y
Orkney	Y	N
Perth and Kinross	N	N/A
Rathmell Archaeology Ltd	Y	N
Scottish Borders	N	N
Shetland	Y	N/A
Stirling and Clackmannan	Y	N/A
Western Isles	Y	N/A
WoSAS	Y	Y

Table 21:
What is your policy regarding the sharing of Geographical Information data?

	Will	Would but can't	Would but have not	Will not
Aberdeen City		x		
Aberdeenshire, Angus and Moray	x			
Dumfries and Galloway	x			
East and Mid Lothian		x		
Edinburgh		x		
Falkirk		x		
Fife			x	
Highland	x			
Orkney		x		
Perth and Kinross	x			
Rathmell Archaeology Ltd	x			
Scottish Borders	x			
Shetland	x			
Stirling and Clackmannan	x			
Western Isles			x	
WoSAS	x			

**Table 22:
MIDAS compliance**

	MIDAS Compliant	Not but actively working toward MIDAS compliance	Not MIDAS compliant
Aberdeen City			x
Aberdeenshire, Angus and Moray		x (Oct 2009)	
Dumfries and Galloway	x		
East and Mid Lothian	x		
Edinburgh	x		
Falkirk			x
Fife	x		
Highland	x		
Orkney			x
Perth and Kinross	x		
Rathmell Archaeology Ltd	x		
Scottish Borders		x	
Shetland	x		
Stirling and Clackmannan			x
Western Isles	x		
WoSAS	x		

**Table 23:
What are your main priorities for your service?**

	Status quo	Service delivery	SMR/HER enhancement	Promotion and interpretation	Other
Aberdeen City	x	x			
Aberdeenshire, Angus and Moray		x			Standards
Dumfries and Galloway		x			
East and Mid Lothian					Budget
Edinburgh			x		
Falkirk	x				
Fife	x				
Highland	x	x	x	x	Community liaison
Orkney			x		Software (GIS)
Perth and Kinross		x	x		
Rathmell Archaeology Ltd		x			
Scottish Borders	x	x	x		
Shetland	x	x	x	x	Manage projects Δ
Stirling and Clackmannan	x				Clearing backlog
Western Isles					Resources: 2 nd post
WoSAS			x		

Δ Manage major research and heritage interpretation field projects.

Table 24:
Scottish Historic Environment data available online accessed on 31st March 2009

National Resources	URL	Resource type
PASTMAP	http://www.pastmap.org.uk	Online data
HLAMAP	http://jura.rcahms.gov.uk/HLA/start.jsp	Online data
HS GI download site	http://hsewsf.sedsh.gov.uk/pls/htmldb/f?p=500:1:4176489032545532	Online data & Data download facility
CANMORE	http://canmore.rcahms.gov.uk/en/advanced/	Online data
Local Authority Resources	URL	Resource type
Aberdeen City	http://www.aberdeencity.gov.uk/App/SMR/xsm_Introduction.asp	Online data
Aberdeenshire, Angus and Moray	http://www.aberdeenshire.gov.uk/archaeology/smr/index.asp	Online data
Dumfries and Galloway	www.dumgal.gov.uk/index.aspx?articleid=2310	Web page
Dundee City	http://www.rathmell-arch.co.uk/Dundee.htm	Web page
East Dunbartonshire	http://www.rathmell-arch.co.uk/EastDunbartonshire.htm	Web page
East and Mid Lothian	None	-
Edinburgh	None	-
Falkirk	http://www.falkirk.gov.uk/services/community/cultural_services/museums/archaeology.aspx	Web page
Fife	None	-
Highland	http://her.highland.gov.uk/	Online data
Orkney	http://www.library.uhi.ac.uk/smr/orksmr.php (www.orkneydigs.org.uk)	Online data
Perth and Kinross	www.pkht.org.uk/HERSearchRecord.asp	Online data
Scottish Borders	www.scottishbordersheritage.co.uk	Web page
Shetland	www.shetland-heritage.co.uk/amenitytrust/	Web page
Stirling and Clackmannan	www.stirling.gov.uk/index/services/planning/archaeology/sitesmonuments.htm	Online data
Western Isles	www.cne-siar.gov.uk/smr/	Online data
WoSAS	www.wosas.net/search.php http://gis.south-ayrshire.gov.uk/wosas/default.aspx	Web page Online data
Non-governmental Resources	URL	Resource type (Online data only)
Buildings at risk register (BAR)	http://www.buildingsatrisk.org.uk/BAR/search.aspx	Online data
The Scottish Wetlands Archaeological Database (SWAD)	http://xweb.geos.ed.ac.uk/~ajn/swad/index.html	Online data
The Scottish Palaeoecological Archive Database (SPAD)	http://xweb.geos.ed.ac.uk/~ajn/spad/index.html	Online data
The Scottish Church Heritage Research Database (SCHR)	http://www.scottishchurches.org.uk/index.php	Online data
The Archaeology Data Service (ADS) Catalogue: ArchSearch	http://ads.ahds.ac.uk/catalogue/search/basic.cfm	Online data

Appendix 7: Web services: An introduction

Web services provide information from one organisation, via the internet, that others can use. Data can be viewed by all those that are allowed to view it and who have the technology to load it. Remote users can view the data but they cannot modify it.

There are two main types:

- Data – supplied as a Web Service.
- Geographic Information such as maps and areas – supplied as either a Web Map Service (WMS), a Web Feature Service (WFS) or a Web Coverage Services (WCS). WFSs may also be referred to as WFS-T (Web Feature Services – transactional)

A Web service is a software system designed to share information over a network or the internet using a standardised set of shared data fields i.e. using standards such as the FISH interoperability toolkit.

Web map services work in a similar way, delivering map data over the web. The web map service converts the host data into a picture that can be loaded into the users GIS system. The user can view the data and overlay it with their own data.

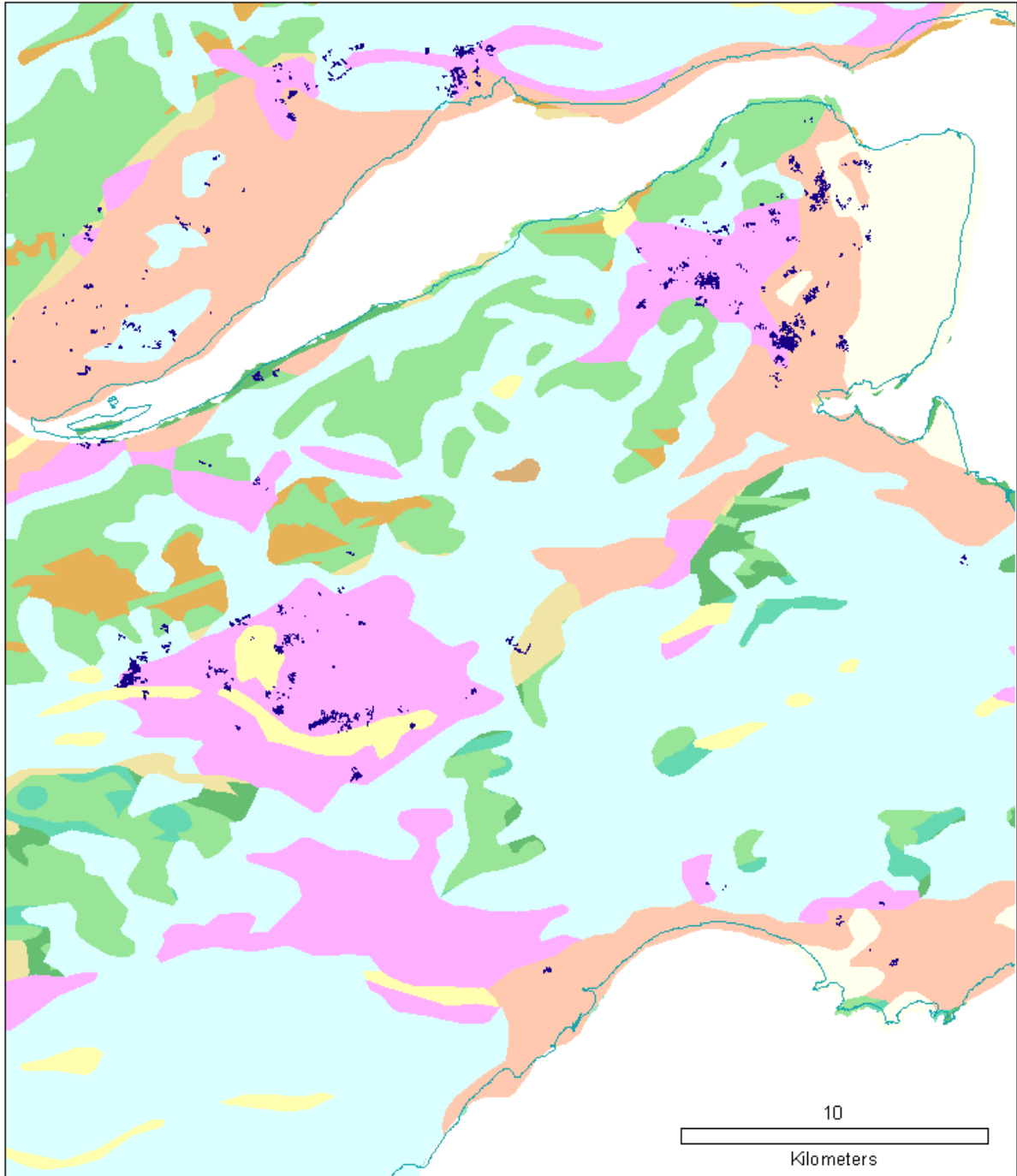
Example: British Geological Survey (BGS) Web Map Service of 1:625,000 map data.

<http://www.bgs.ac.uk/data/services/geolwms.html> [Accessed 5th March 2009]

In this example – see figure on page 40 - RCAHMS air photograph transcriptions are overlaid on BGS Web Map Service of 1:625 000 map data. Combining these two datasets, one in-house and one online web service, was simple and quick yet the resulting figure allows the user to visualise this striking relationship between the geology and the crop marks without having to apply to the BGS for a data download.

Web feature services provide the actual geographic information. Users can interact with points and polygons as if they were hosted on their own system.

The user can interrogate the shape to provide data that is not held in the database such as the polygon's area and perimeter. The polygon might also be used to filter other datasets by allowing the user to select only sites that fall within the polygon.



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'Based upon UK onshore and offshore bedrock and superficial geology WMS, with the permission of the British Geological Survey'.

This figure combines RCAHMS aerial photograph transcriptions for NE Fife with a British Geological Society (BGS) web map service (WMS) of UK onshore and offshore bedrock and superficial geology. The aerial photograph data is sourced from the corporate RCAHMS GIS data store whereas the BGS data is streamed live over the web. The data sets are combined and viewed together in RCAHMS' in-house GIS software, ESRI ArcMap 9.2.

The web map service is available at: http://ogc.bgs.ac.uk/cgi-bin/BGS_Bedrock_and_Superficial_Geology/wms?

Appendix 8: Glossary

ADS	Archaeology Data Service
AGI	Association of Geographic Information
ALGAO	Association of Local Government Archaeological Officers
BGS	British Geological Survey
Defra	Department of the Environment, Food and Rural Affairs
EH	English Heritage
FISH	Forum on Information Standards in Heritage
GI	Geographic Information
GIS	Geographic Information System
HE	Historic Environment
HEIRNET	Historic Environment Information Resources Network
HER	Historic Environment Record
HS	Historic Scotland
INSCRIPTION	National reference data terminology lists
IT	Information Technology
IS	Information Systems
MIDAS	Data standards (Monuments Inventory DATA Standards)
OASIS	Online Access to the Index of archaeological investigations
SMR	Sites and Monuments Record
RCAHMS	Royal Commission on the Ancient and Historical Monuments of Scotland
UDDI	Universal Description, Discovery, and Integration
ULA	Unitary Local Authority
WCS	Web Coverage Services
WFS	Web Feature Service
WFS-T	Web Feature Services – transactional
WMS	Web Map Service
WoSAS	West of Scotland Archaeology Service