Why we need a Spatial Data Infrastructure for Archaeology

Peter McKeague
Historic Environment Scotland
Themes

• Legislation and best practice
  - INSPIRE – making Protected Sites data available online
  - to promote knowledge about the historic environment

• Are we making the most of the data archaeologists create?
  - access and licensing
  - multiple data creators
  - format

• Sensitivity
  - who should access data and to what level of accuracy
    (-charging policies)

• Why does it matter?

http://blueeyedennis-siempre.blogspot.co.uk/2011/10/i-wouldnt-start-from-here.html

Reused under http://creativecommons.org/licenses/by-nc-nd/3.0/
INSPIRE sets down the general rules for establishing an infrastructure for spatial information in Europe for the purposes of Community environmental policies and policies or activities which may have an impact on the environment.

A Protected Site is defined as an

“Area designated or managed within a framework of international, Community and Member States' legislation to achieve specific conservation objectives” [Directive 2007/2/EC].

“..a Protected Site is 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.” [International Union for the Conservation of Nature]

Some historic environment data is covered within INSPIRE under the Protected Sites Theme.
INSPIRE compliant metadata and web services available through the Scottish Spatial Data Infrastructure Portal

But designation data is also directly from the Historic Environment Scotland spatial download page

National aggregators for digital data
Online portals provide access to a range of Protected Sites data.

But what about the wealth of primary spatial data gathered through fieldwork? Data can be created through academic research, in response to planning applications or through community groups.
Every year archaeologists undertake thousands of projects from remote sensing to complex excavations.

These projects are expensive to undertake, the data created is unique and in many cases irreplaceable (Preservation by record)

Yet we only use a fraction of this data in compiling the archaeological record – consigning the spatial component of the record to a point rather than mapping the full extent of the fieldwork
A history of investigation: geophysical surveys along the Antonine Wall from 1995 to 2007

Data can be combined with other datasets such as airborne mapping interpretation or excavation data
### OASIS DATA COLLECTION FORM: Scotland

<table>
<thead>
<tr>
<th>OASIS ID: gsbprosp1-73763</th>
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**Project details**

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<tr>
<th>Field</th>
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<td><strong>Project name</strong></td>
<td>Geophysical Survey at Balloch, Tobermory</td>
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<tr>
<td><strong>Short description of the project</strong></td>
<td>Results from the resistance survey correspond with the extant earthworks and structural remains with areas of high resistance identified on the resistivity survey and the presence of a prehistoric surface.</td>
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<td><strong>Previous/future work</strong></td>
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<td><strong>Any associated HER event No.</strong></td>
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<td>294740 - NRHS UID</td>
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<td><strong>Sedimentary Note</strong></td>
<td>ANDESTEIC AND BASALTIC LAVAS AND TUFFS - UND</td>
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<td>PEAT</td>
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<td>Ground penetrating radar</td>
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**Project location**

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<tr>
<td><strong>County</strong></td>
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<tr>
<td><strong>Site location</strong></td>
<td>ARGYLL AND BUTE KILWINNAN AND KILMORE Balloch</td>
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<td>NH 4967 5407 56 5121550500 6 3.001173953061 86.36</td>
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**References**

https://canmore.org.uk/site/294740/

Courtesy: GSB Prospection
A history of investigation: geophysical surveys along the Antonine Wall from 1995 to 2007

Capturing the technical metadata through OASIS

The Geophysical Survey Database
Historic England, 2012

We can capture the exploration metadata consistently and publish as a database but consistently fail to document the spatial content

and the published record on the Geophysical Survey database.
Survey outputs: the tyranny of the PDF

Grid extents by technique

Greyscale plot of results

Analysis of survey results

Interpretation

More flexible and Reusable formats

Project specifications also required copies of the digital data

Are we getting best value from survey data?
New life for old plans: survey of Hut-circles and field system at An Sidhean, Islay
New life for old plans: An Sidhean is part of the Loch Gruinart / Ardnave RSPB Reserve, Islay
Historic Landuse assessment (HLA) project created a vector based dataset across Scotland
HLA is publicly available through https://map.hlamap.org.uk/
Data can be downloaded under an End User Licence as it contains data derived from the Ordnance Survey base map.
Historic Landscape characterisation projects undertaken regionally across England
Project archives lodged with the Archaeology Data Service – as PDFs and Jpgs
Whereas the archived HLC data is a dumb raster format...
Measure once

Use often!

https://5stardata.info/en/
We need to reflect different approaches to sensitivity of data
INSPIRE sets down the general rules for establishing an infrastructure for spatial information in Europe for the purposes of Community environmental policies and policies or activities which may have an impact on the environment

- Data should be collected once and maintained at the level where this can be done most effectively
- The ability to combine seamlessly spatial data from different sources and share it between many users and applications
- Spatial data should be collected at one level of Government and shared between all levels
- Spatial data needed for good Governance should be available on conditions that are not restricting its extensive re-use
- It should be easy to discover which spatial data is available, to evaluate its fitness for purpose, and to know which conditions apply for its use.

Source: David Fry, Inspire Directive: GIS Professional issue 15, April 2007, 18
Towards an inclusive Spatial Data Infrastructure for Archaeology

Data creators
- National Agencies
- Local authorities
- Estate management
- Private sector - Commercial archaeology - Consultancy
- Community groups
- Private research
- Universities

Reporting
- Organisational Portals
- Data aggregation
- Organisational Portals

Governance
- Operational - Technical

Heritage SDI

National Spatial Data Infrastructures
- Discovery metadata
- Web Map Services
- Web Feature Services
- Feed to INSPIRE (and other) Geoportal

Organisational resources
- Portals
- Web services

Organisational Portals

Web services

Data creators

Data standards

Thematic portals
The need to move from ‘an object-orientated approach towards a spatial approach in heritage planning’

and to

'consider cultural landscapes early as part of land use and spatial planning processes’

Ensure that decision making is informed and that sound evidence-based information is available at all levels of decision making.
(Scottish Government 2014)
Why does spatial data matter?

We need the best data to inform our own decisions
People expect to find data online
In the next decade geospatial technology will be ubiquitous
Automated decision making through Big Data analysis
Manifesto

That there is a need to coordinate better use of the geospatial data created through archaeological fieldwork and research to:-

• Maximise the value from unique observations about the past – often gathered at great expense

• enable better data discovery

• better inform our own decision making processes

• but also to inform environmental policies, planning activities and research about the historic environment

• promote knowledge and appreciation about the historic environment

We need to learn from and build on what is already there

• INSPIRE
• Best practice – One Geology, marine Spatial Data Infrastructures
• Ariadne and Carare data aggregators

But also acknowledge the Challenges:

• Information silos
• Not mandated
• Declining resources
• Lack of coordination