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Developing Access to Digital Archaeology Data Resources in Ireland

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The creation of a trusted digital archive in Ireland with the establishment of the Digital Repository of Ireland provides the opportunity to archive, manage and facilitate open access to archaeological and historic environment digital data. This overview explores the present situation in Ireland and describes the current responsibilities of several of the state bodies and organisations in Ireland and their response to providing open data. Examples are given within the geospatial domain, where more progress has been achieved, and the initiatives of Transport Infrastructure Ireland in opening up their resources are examined. Finally, with the advent of new government policy and potential legislation, future possibilities are highlighted.

1. Introduction

Irish archaeology holds a rich and fascinating history that spans thousands of years. From the earliest prehistoric tombs and ceremonial sites to imposing castles and extensive monastic settlements, the island of Ireland is home to a wealth of archaeological wonders. These remnants of the past offer a glimpse into the diverse cultures and civilizations that have shaped the land.

The National Monuments Service of Ireland, which is responsible for the protection and preservation of these archaeological sites, maintains a register of approximately 140,000 recorded archaeological monuments. These range from Mesolithic settlements sites, prehistoric ritual and burial monuments, such as passage tombs and stone circles, to medieval castles, monasteries as well as more recent historical structures. New archaeological discoveries are made every year, adding to the ever-growing list of Irish monuments. In addition to this the National Museum of Ireland Archaeology Museum houses extensive collections, which include prehistoric artefacts, such as Neolithic and Bronze Age objects, as well as treasures of the Celts, Vikings and from the Middle Ages. To fully understand and manage this rich cultural resource, effective access to the full spectrum of related archaeological and



historic environment data is required. To what extent this has been achieved, and what is still to be realised is explored within this article.

2. State Bodies: National Monuments Service

In Ireland, the National Monuments Service (NMS) of the Department of Housing, Local Government, and Heritage is the primary government body tasked with the protection, preservation and regulation of activities affecting archaeological sites and monuments. Along with the Office of Public Works, the NMS is also tasked with the management of Ireland's sites and monuments that are in State Care. Included in its remit is the long-term stewardship of archaeological data, that is, the data arising from records about, and interventions upon, the archaeological sites and monuments of Ireland. The NMS works in collaboration with other organisations, such as the National Museum of Ireland (NMI) and local authorities, to ensure the preservation and management of archaeological sites and data. They establish policies and guidelines for archaeological research, excavation, and reporting, and they provide support and advice to individuals and organisations involved in archaeological work. The NMS works collaboratively with a variety of infrastructural organisations and has put in place code of practice to facilitate this.

Within the NMS, the Archaeological Survey of Ireland (ASI) is tasked with the compilation of the inventory of archaeological monuments in the State, commonly known as the Sites and Monuments Record (SMR). Most individual entries within the SMR are stored within a central database. Summary entries from that database can be accessed online via a map interface (www.archaeology.ie). In addition, a larger series of paper files relating to each monument are stored in the National Monuments Service Archive, which contains more comprehensive descriptive and documentary information including: descriptive information, field reports, historical references, maps, plans, and photographs. Effort has been made in the past to digitise this collection; however, reuse of this digital resource is currently limited, with special access provided only through formal application. The majority of researchers and the general public are only able to access the hard copy SMR archive by a personal visit to the National Monuments Service Archive, Dublin, on a single day each week (Fridays 10am–5pm) following the submission of an appointment request at least three days prior to their visit. There is limited access to records, and a maximum of 60 files can be requested per visit. In-person access to this resource is an inefficient use of both the users' time in travelling and arranging access, but also this places additional demands on archive staff to collate documents as they are requested.

In addition to the SMR, the NMS also manages any reports generated through their regulation of licensed archaeological activities (archaeological excavations, the use of detection devices for archaeological purposes and underwater archaeology) under the National Monuments Acts 1930-2004 and the associated regulations. While the legislation does not explicitly address archaeological data, the documentation and reporting of archaeological excavations and surveys are integral to the process. Archaeologists are required to maintain accurate records and submit reports



detailing their findings to the NMS, including plans, drawings, photographs, site notebooks, record sheets, context sheets, finds lists or similar or related material, whether in paper, hard copy or digital form. Generally, submissions include a digital and hard copy of the final report and any associated specialist reports and appendices. Apart from the guidance to supply the report as a PDF format document via USB or CD-ROM to the NMS, no requirements to supply the digital supporting data and associated formal metadata for any of the submissions are stipulated. The use of formal thesauri and schemes is limited to the monument classification, with no designated formal list for additional archaeological phenomena or activities such as periods, material, components, events and archaeological activity. Therefore integration of SMR data with other datasets can be limiting. Where a thesaurus is used for monument classification its structure is flat and it is not equipped with Uniform Resource Identifier (URI) references for vocabulary concepts, thus limiting the scope to relate other records as Linked Open Data (LOD) (Binding and Tudhope 2016). By the very nature of the archaeological activities being licensed by the NMS, this provides them with the potential ability to demand adherence to a suite of data standards to form a digital archive; however, existing resources and digital infrastructure within the NMS would not be suitable to house and provide access to such a digital archive.

An online summary of excavations is available through excavations.ie, which is operated by Wordwell Publishing. This catalogue was initially funded by the Office of Public Works (OPW) but in recent years has received financial support from the NMS. It is a comprehensive compilation that presents summaries of over 30,000 accounts of all excavations conducted in both jurisdictions on the island of Ireland between 1970 and 2021. The valuable information contained within this collection is gathered from the Excavations Bulletins published during the period spanning 1970 to 2010 and all subsequent online reports. The data contained within this dataset could provide the basis for the presentation of full excavation reports, if additional controlled vocabulary was utilised and the data were mapped to a recognised metadata standard. The online database also does not take advantage of those excavation reports that exist online, such as the Transport Infrastructure Ireland's grey literature, within the Digital Repository of Ireland (DRI).

3. State Bodies: National Museum of Ireland

Under the National Cultural Institutions Act [1997](#), the National Museum of Ireland has the authority and responsibility for the acquisition, preservation, and management of collections, including artefacts of historical, archaeological, and cultural significance. The act grants the museum the power to compile and maintain records, catalogues, and databases related to its collections.

While the specific provisions related to artefact data management may not be explicitly outlined in the legislation, the National Museum of Ireland follows professional museum practices and standards for the documentation, cataloguing, and management of its collections, including artefacts, with international cataloguing standards used including SPECTRUM; ISAD (G); IGAD; MAARC.



The NMI is involved in the management of excavation archives, particularly concerning the deposition of certain types of artefacts and finds. Excavation directors may be required to submit copies of excavation reports, specialist reports, and other relevant documentation to the NMI, along with the physical artefacts. Before submitting excavated objects to the NMI, excavators are required to provide thorough documentation of the objects in a digital format. This documentation should encompass detailed information about the excavated objects as detailed in the NMI publication *Standards for the Care and Treatment of Archaeological Objects from Excavations* (National Museum of Ireland [2022](#)). Archaeological excavators provide this information to the museum in the form of a formalised Microsoft Excel spreadsheet for both artefacts and samples, including ecofactual material, with some limited vocabulary terms for artefacts and material types. Access to these data is not open via any web interface but can be arranged following an application to the NMI. The NMI has developed several digital initiatives over the years, including the Inventory Project, which aims to create a database record for each artefact in the core collections with associated registration number, location and a description that was scaled back from the original Documentation Plan project (Smith *et al.* [2010](#)). The [Historical Collections Online Programme](#) has managed to digitise and provide access to 10,000 objects; however, the majority of the items relate to Ireland's modern history and not its archaeology collection. The NMI recently became a member of the DRI and has deposited a sample set of digital assets within the repository from the Inspiring Ireland Project (National Museum of Ireland [2015](#)). Hopefully this new partnership will encourage the NMI to deposit and provide open access to additional datasets.

4. Open Access Geospatial Data

One of the areas that has seen the most development in Ireland regarding open access to historic environmental data is the sharing and reuse of geospatial cultural heritage data (McKeague *et al.* [2020](#)). This is the result of several factors, including the underpinning requirements of the [EU INSPIRE directive](#) compelling those with the responsibility for protected sites to make such data available online, and the prevalence and relative ease with which organisations can publish geospatial services platforms using both commercial ([ArcGIS Enterprise Server](#)) or open source solutions ([GeoServer](#)).

Within Ireland, the NMS has published several datasets through both the Irish Government's [Open Data portal](#), including national datasets such as the SMR, the Wreck Inventory of Ireland and the National Inventory of Architectural Heritage (NIAH), along with discrete subsets of these focusing on specific monument subtypes, e.g. sweathouses. However, no additional data exist within these as they are just subsets other than information extracted from the national SMR. The majority of the data is available to download directly in CSV, KML or zipped shapefile format, or as a direct data service (ESRI REST). Other organisations within the public sector have also shared their data within this framework including local authorities, The Heritage Council and Transport Infrastructure Ireland (TII). One of the initiatives that capitalises on this and brings many of these datasets together is The Heritage Council's [Heritage Maps Viewer](#). This website aims to provide a 'one stop shop' where users can discover and explore historic environment datasets that



were collected by government departments and local authorities and it provides the ability to create customised maps and perform basic on-screen analysis, such as measure areas and distances and identify points of interest. Although progress has been made to provide open access and reuse of these data, many of the published data would sit to the middle or bottom of the proposed [Five Star schema](#) for Linked Open Data defined by Tim Berners Lee.

Where organisations have more advanced infrastructural geospatial resources and technical skills available, access to more sophisticated historic environment spatial data has been enabled. The [INFOMAR programme](#) aims to provide comprehensive and accessible marine datasets for Irish waters that underpin and add value to marine research and is funded by the Department of the Environment, Climate and Communications (DECC), and delivered by joint management partners Geological Survey Ireland and the Marine Institute. The [INFOMAR Data Download Portal](#) enables users to gain access to bathymetry data and associated metadata and download a range of data, including GeoTIFF and CSV formats. Included in this information is survey data collected on and around historic wreck sites. Another data service hosted by the Geological Survey Ireland is the [Open Topographic Data Viewer](#). This project is a collaboration between a range of state and semi-state organisations (Geological Survey Ireland, Department of Culture, Heritage and the Gaeltacht, Discovery Programme, Transport Infrastructure Ireland, New York University, The Office of Public Works, Westmeath County Council, the Heritage Council), all of which were keen to make all of their high-resolution topographic data freely available, particularly as public finances provide the funding for the data collection. The aim of this viewer is to host LiDAR from all interested government and non-government organisations and to build up a mosaic of available data across the country and make them freely available to stimulate new research and improve existing products and techniques.

5. Collaboration for Open Access Transport Infrastructure Ireland

Transport Infrastructure Ireland (TII) has responsibility for the provision of safe national road and light-rail (including trams and metro services) networks. With regard to archaeology and heritage, TII's primary objective is to minimise impacts associated with TII's capital projects and programmes. It achieves this by managing archaeological risk, ensuring legislative compliance, and building public trust. The TII works in close collaboration with state agencies, local authorities, archaeology and heritage societies, community groups and heritage contractors to disseminate and promote the results of TII archaeological and heritage works locally, regionally and nationally.

TII is actively involved in several external research initiatives including INSTAR (Irish National Strategic Archaeological Research), where it has acted as industry partner for several projects. TII has also directly commissioned several archaeological and heritage-driven research projects, most recently the 'Automatic Detection of Archaeological Sites', which is currently being led by the Discovery Programme. This project seeks to use machine-learning techniques for the automatic identification of



enclosures captured by Lidar. If this approach is successful, TII will be able to identify potential and previously unrecorded sites and consider them in the design process, to see if damage can be avoided.

A key aspect is the dissemination of information arising from their many projects through engagement in regional heritage events and the publication of monographs and books on the archaeological and heritage aspects of TII works. Further dissemination is achieved through [Story Maps, Audiobooks and free to read PDFs](#). We recognise that successful dissemination requires multiple methods and channels, some of which are short term in nature (e.g. a lecture), while others have a longer-term perspective (e.g. archaeological books).

TII recognises a three-fold model for research; firstly there is the instrumental research (e.g. reviewing existing practice and policy, developing new guidance and standards, and informing contract documentation) to fulfil its core objectives. TII also recognises the intrinsic research that is undertaken in the course of archaeological and heritage work on TII projects and schemes (e.g. archaeological assessments, EIAR, audiobooks, story maps, archaeological monographs and, of course, TII-directed research programmes). Finally, TII enables research by others, and this is achieved by making the data, information and knowledge as widely available as possible.

Technical reports (and other resources) are also accessible through the [TII Digital Heritage Collections](#), on the Digital Repository of Ireland (DRI). Launched in 2015, the DRI serves as a trusted and nationally recognised repository infrastructure for humanities, cultural heritage, and social sciences data in Ireland. The DRI currently holds both the status of a Trustworthy Digital Repository (TDR) and has been certified by the Core Trust Seal since 2018. With its ability to provide reliable, long-term, sustained access to cultural heritage and archaeology digital data. The DRI makes all its data openly available, in line with the FAIR data principles (Findable, Accessible, Interoperable, Reusable) to ensure high levels of access and reuse among researchers, cultural heritage enthusiasts, and members of the public. These collections were initially established as a collaborative project between TII, DRI and the Discovery Programme as part of the EU-funded ARIADNE Project, and have been growing since initially established in 2017.

One recent innovation has been the updating of the TII Digital Heritage Collection with the PeriodO chronological framework developed by Project Radiocarbon (Hannah *et al.* [2022](#)). This chronological framework allows multiple datasets to be linked together based on chronological periods independent of the absolute dates of the material. This update was carried out at a root/collection level, rather than at the object level, which was clearly more efficient and effective than having to update individual records on an object by object level. This did not reinterpret the chronological framework already assigned to these excavated sites, but linking this existing site-based data to the new chronological schema for the island of Ireland enables the legacy data to be better integrated with a host of other datasets. For future projects, directors will be invited to consider the PeriodO classifications (Carlin *et al.* [2022](#)) in the interpretation of their sites. This ultimately provides greater exposure to this valuable information, enhancing the findability of Irish data and



facilitating comparative work in a global context, especially as these collections are accessible through europeana.eu.

6. Future Developments

At the time of writing there are several current factors and initiatives that may prove beneficial to the opening up and reuse of a wider selection of historic environment data. Several government policy documents, including the Open Data and reuse of Public Sector Information Directive (EU) [2019/1024](#) mandates release of public sector data in free and open formats to assist in the reuse of publicly funded research data and prevent data lock-in. High Value Datasets (HVDs) such as geospatial and environmental data will be a priority, and it remains to be seen if archaeological research capitalises on these. The Department of Public Expenditure and Reform (DPER) through their Open Data Unit reflection of the directive (Circular 20/2021) also broadens the concept of data with:

'data ... not confined to "tabular data" but means all or part of any document, record or data, whether in physical, electronic or other form and includes: any memorandum, book, plan, map, drawing, diagram, pictorial or graphic work, any photograph, and any sound, visual or audio-visual recording'.

This should enable the promotion of a wider and more representative selection of archaeological data to be made available through open access. Specifically within the Department of Housing, Local Government, and Heritage, policy documents such as Heritage 2030 (Department of Housing, Local Government and Heritage [2020](#)) and Connecting Government 2030 (Office of the Government Chief Information Officer [2022](#)) have specific initiatives for the enhancement of the historic environment data including Action 33: Develop a national management plan for national cultural heritage datasets and Action 71: Develop a coherent policy for the management of Ireland's digital heritage data. Currently in Ireland, the legislative framework that underpins much of the historic environment is being replaced with a new bill, The Historic and Archaeological Heritage Bill [2023](#) which will repeal the National Monuments Acts 1930 to 2014 and may introduce new mechanisms and processes to ingest and distribute archaeological data.

7. Conclusion

Access to the rich archaeological and historic environmental data that underpins this substantial collection of tangible cultural heritage exists at various levels of completeness and openness, with the full richness and research potential of these objects still to be realised. Gains have been made within both the NMS and NMI to provide online and open access to some of their data; however much of their data collections remain locked within each institution. Efforts have been made to progress the situation by publishing historic environment geospatial data but this is only the tip of the data iceberg potentially available. Current collaboration between the TII, DRI and the Discovery Programme potentially demonstrates a possible model for increased access to archaeology data in the future.



Bibliography

Binding, C. and Tudhope, D. 2016 'Improving interoperability using vocabulary linked data', *International Journal on Digital Libraries* **17**, 5–21. <https://doi.org/10.1007/s00799-015-0166-y>

Carlin, N., Hannah, E. and Corns, A. 2022 'Archaeological periods for the island of Ireland'. <http://n2t.net/ark:/99152/p06hps8> [Last accessed: 12 April 2023].

Department of Housing, Local Government and Heritage 2020 *Heritage 2030* <https://www.gov.ie/en/publication/778b8-heritage-ireland-2030/>

Directive (EU) 2019/1024 of The European Parliament and of The Council, 2019. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32019L1024> [Last accessed: 12 April 2023].

Hannah, E., Carlin, N., Griffiths, S., Gaydarska, B., Swan, R. and Corns, A. 2022 'Project Radiocarbon', *Archaeology Ireland* **36**(3), 14–17. <https://www.jstor.org/stable/27198744>

Historic and Archaeological Heritage Bill 2023 <https://www.oireachtas.ie/en/bills/bill/2023/2/> [Last accessed: 18 May 2023].

National Cultural Institutions Act 1997 <https://www.irishstatutebook.ie/eli/1997/act/11/enacted/en/html>

National Museum of Ireland 2015 *The Inspiring Ireland Project*. National Museum of Ireland, Digital Repository of Ireland [Distributor], National Museum of Ireland [Depositing Institution], <https://doi.org/10.7486/DRI.9593x130k> [Last accessed: 12 April 2023].

National Museum of Ireland 2022 *Standards for the Care and Treatment of Archaeological Objects from Excavations*. https://www.museum.ie/getmedia/222c77e9-35dc-4345-b260-f67e835a5348/IAD_StandardsforExcavationObjects_1.pdf [Last accessed: 12 April 2023].

Office of the Government Chief Information Office 2022 *Connecting Government 2030: A Digital and ICT Strategy for Ireland's Public Service* <https://www.gov.ie/en/publication/136b9-connecting-government-2030-a-digital-and-ict-strategy-for-irelands-public-service/>

McKeague, P., Corns, A., Larsson, Å., Moreau, A., Posluschny, A., Van Daele, K. and Evans, T. 2020 'One archaeology: a manifesto for the systematic and effective use of mapped data from archaeological fieldwork and research', *Information* **11**(4), 222. <https://doi.org/10.3390/info11040222>



Smith, A.S., O'Connor, A., O'Neill, R. and Vaucheret, S. 2010 'A new documentation initiative within the National Museum of Ireland - Natural History Division', *NatSCA News* **20**, 28-33. <http://www.natsca.org/article/1370> [Last accessed: 12 April 2023].