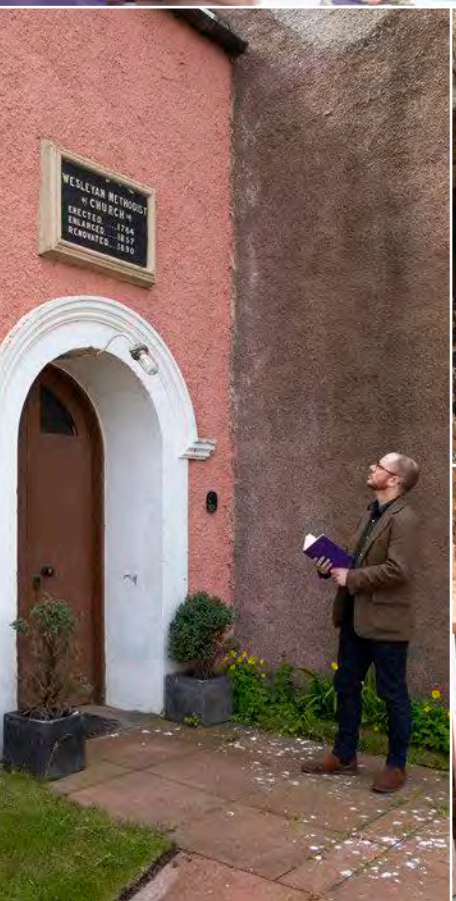
SURVEY & RECORDING ROUNDUP

2018–19

HISTORIC ENVIRONMENT SCOTLAND | ÀRAINNEACHD EACHDRAIDHEIL ALBA


Scottish
Oral History
Centre
Supporting and undertaking
oral history projects


Scottish
Oral History
Centre


WESLEYAN METHODIST
CHURCH
ERECTED 1764
ENLARGED 1857
RENOVATED 1890

CONTENTS

COVER

Detail of the Ross Fountain, Princes Street Gardens, Edinburgh. Survey and Recording photographers documented the dismantling of this spectacular cast-iron fountain of 1872 before it was transported to Wigan for restoration and conservation. They then recorded it in its reinstated colourful glory when it was returned to the gardens in 2017. You can now trace the story of the fountain in the National Record of the Historic Environment from the original architectural designs through historic photographs, the painting over of the whole fountain in metallic gold in the 20th century to its newly restored state. DP309052

1. INTRODUCTION

What is the historic environment?

We see it as everything that has been created by people over time: the tangible and intangible. It can be a place, an object or an idea. It can be a castle, a ruined abbey or a stone circle; a high street, a colliery or a garden; a book, an instrument – even a song or a piece of music. It's all those things that we've made, all the way up to today. The historic environment is Scotland's story.

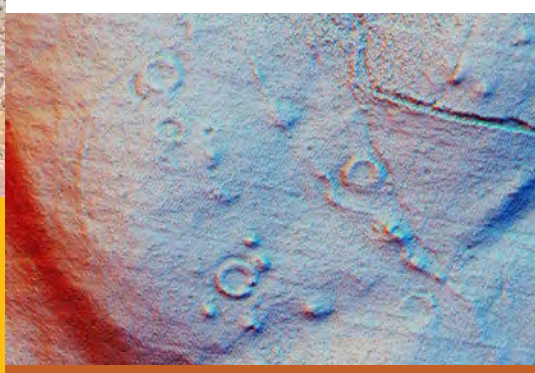
HES, *Heritage for All: Corporate Plan 2019 Onwards*

At Historic Environment Scotland (HES), we look after over 300 historic properties and sites, but we are also interested in the whole of Scotland's historic environment, from prehistory to the present day. In order to understand what we see around us, as well as what has gone before, we research, survey and document buildings, industries and archaeological sites and monuments. We share what we discover through the National Record of the Historic Environment (NRHE), which you can view online at canmore.org.uk; we also carry out a programme of engagement so that we can work together to learn more about places that matter to local communities. This roundup showcases some of the recent work carried out by the HES Survey and Recording Group to research, survey, document and share the story of Scotland's historic environment.

THE SURVEY AND RECORDING STAFF

Our Survey and Recording Group includes archaeologists, architectural historians, data specialists, mapping experts, photographers, surveyors and curators. We work together but also break into five smaller groups to deliver all that we do:

Our ***Architecture and Industry*** team documents all types, styles and periods of buildings as well as documenting the nation's industrial heritage.



Our ***Rapid Archaeology Mapping Project*** team also does this, but with a special remit for experimenting with new technologies and cutting-edge methods. The team also take to the air to record Scotland from above.

Whether you would like more information about a site or place, or have an idea about how we might help provide training so that you can investigate what interests you in our historic environment, the first point of contact will normally be through the HES Public Services team at archives@hes.scot. Through them we can provide information, advice or perhaps work with you to develop your own heritage projects.

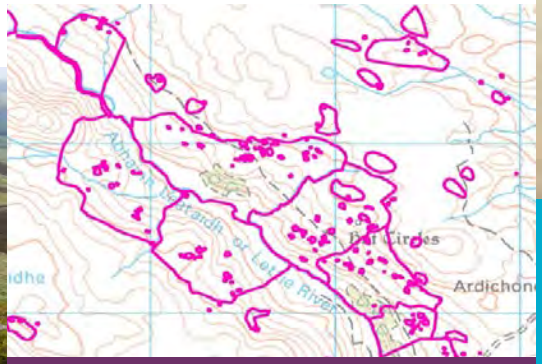
See what we found

You can find out about what we discovered this year as well as what we've investigated and collected for over a century at canmore.org.uk. You can also visit our Search Room to consult original archive and collections material. Entrance is free and you can browse our books and photographs. If you would like to see original historic drawings, photographs and manuscripts you can order these through our website and make an appointment to view up to 10 items, or you can request material on the day of your visit. Contact us on +44 (0)131 662 1456 or fill out the online Search Room Booking Request form to make an appointment to visit our Search Room at John Sinclair House, 16 Bernard Terrace, Edinburgh EH8 9NX.

Meeting the aims of government

Our Place in Time is Scotland's strategy for the historic environment. Published in 2014, it sets out a vision of how the nation's historic environment can be understood, valued, cared for and enjoyed. HES plays a vital role in leading the delivery of the strategic priorities in this important document, the first ever of its kind for Scotland. We protect and celebrate the historic environment so that we can pass it on to future generations while also making sure that it contributes to the nation's wellbeing here and now. We investigate and record Scotland's historic environment, continually developing our knowledge, understanding and interpretation of Scotland's fascinating past, and we share what we discover.

Our ***Archaeological Survey*** team surveys and records landscapes and sites from all periods, continuing the work that we've done for decades.



Our ***Data Management*** team makes sure that quality information is captured and entered into the National Record in the best ways possible for all our users.

Our ***Engagement*** team works with communities and get our work out into the world innovatively and creatively.

2. RESEARCHING THE HISTORIC ENVIRONMENT

We know that research is a process that must be based on accurate information. The high standards that we use when surveying and recording mean that the material we produce is trusted by researchers. While some of our activities are intended to answer specific research questions, we also create records that will be preserved in the National Record of the Historic Environment, to be used in the future. Our long-term thematic project on **Early Medieval Carved Stones** is a good example of the production of raw material for future study. Our surveys of **Easdale Island** and **Traprain** and **North Berwick Laws** have produced records that enable our present and future users to better understand these specific sites. The surveys of the **Aerial Defences of the Clyde** and the Cromarty Batteries have been carried out partly in preparation for the centenary of the Second World War from 2039 – we know that evidence on the ground is already vulnerable, and much will be lost between now and then. Our survey of houses like the Meadowland and 51 Braid Farm Road not only reflects the current interests of historians and lovers of midcentury architect-designed post-war properties, but also adds to the completeness of a National Record that includes country houses, tenements, tower blocks and much more.

What is the National Record of the Historic Environment?

The **NRHE** is one of Scotland's five National Collections. It has been created through surveying, recording, researching, collecting and sharing architectural and archaeological material and information since 1908. More recently, it has widened its scope to include industrial and maritime records too. It holds over a million objects and over 320,000 records relating to sites, mostly in Scotland.

2.1 CARVED IN STONE

Recording all of Scotland's early medieval sculpture continues to be a major, long-term project for the Survey and Recording Group and has produced hundreds of analytical drawings that are now preserved in the National Record for further study and interpretation. There is still more work to do but we hope to have completed this mammoth task by 2020. This year our focus has been on St Andrews Cathedral and Govan where the second and third largest collections of early medieval sculpture are found.

Recording early medieval sculpture is often a challenging exercise; depending on how they are placed, the stones can be difficult to get around if you want to see the whole sculpture, and poor weather conditions can significantly slow up or halt the recording process. In order to speed up the programme, in 2018 we experimented with new technology as part of our survey of an important group of hogback stones at Govan Old Parish Church. We used a laser scanner to create distortion-free, 3D information about the hogbacks. This digital information helped us generate a set of elevations that were then used as accurate templates for the measured survey drawings. Using the laser scanner speeded up the process, and the measured survey of the hogbacks was completed by the end of the summer, allowing us time to record the rest of the stones found at the church too.

Some of Govan's stones were thought to have been lost, destroyed or inadvertently cleared away in the 1970s when the east wall of the graveyard was unintentionally blown up during the demolition of the neighbouring shipyard. Happily, three of the lost stones were rediscovered just under the turf during a community excavation in March 2019 so these too have been fully recorded.

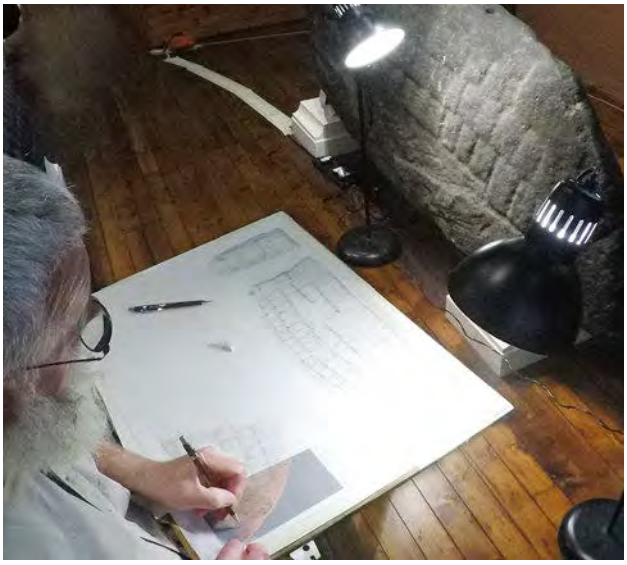
What is a hogback?

Hogbacks are a type of grave marker found mainly along maritime routes in England and Scotland at sites associated with Norse settlement. They date largely from the early 10th century, though some examples might be as late as 12th century. The name derives from the distinctive curved ridge that varies in height from stone to stone, resembling the curved back of an animal. The length and section-shape of the stones echo house types found in Scandinavia at the time, suggesting that their form represents houses for the dead. The decoration on the stones varies; many are carved and have a design along the sides that represents roof shingles. Some hogbacks are decorated with interlace and scrolls while others are plainer. The hogbacks found at Govan are the largest stones of this type in Britain.

Hogback stones featured in the north transept museum area of Govan Old Parish Church. SC1084236

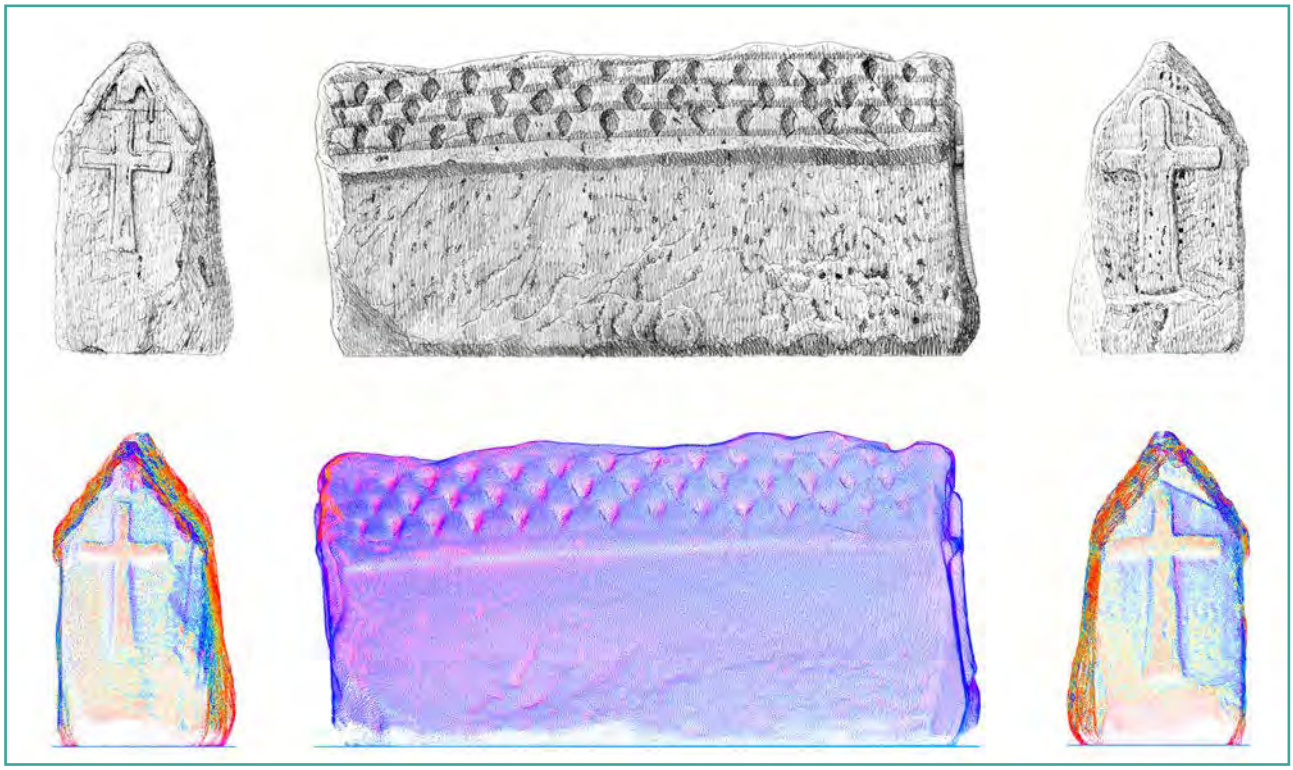
St Andrews Cathedral – a Historic Environment Scotland Property in Care – has a collection of 95 stones and fragments, second only to the number found on Iona. Work on recording these sculptures coincided with a proposal to redisplay the collection in the Cathedral Museum. Professor Jane Geddes of the University of Aberdeen was appointed to rationalise the collection's various numbering systems and to write a full description of each stone. Working with Jane has proved a very fruitful collaborative exercise, with descriptions and measured drawings each informing the other.

At times, the current museum layout made the recording process difficult. Many of the stones are displayed in rows, back to back and close together; others are slotted into concrete bases; and a few are set into niches, making it impossible to view the side set against the walls. In some instances, a full record will not be possible until they are moved. However, most of the work has been completed and this visual audit has identified a much larger range of ornament types than was previously thought, including some rare and indeed unique features.



Surveying a carved stone.

Laser scan visualisation and hand-drawn elevations of St Leonard's shrine, St Andrews Cathedral.



2.2 SLATE ISLAND

As one of the world's most important industrial nations from the 18th century onwards, Scotland has a wealth of remains that give a glimpse of how industrial processes worked. These also tell us of the everyday lives of the people who toiled in laborious conditions that are hard for us to imagine today. One of our recent surveys has been of a tiny island off Scotland's west coast. For over 100 years, this was a major producer of slate at a time when the nation was in the midst of a building boom.

The island of Easdale, along with other nearby 'slate islands', forms part of the Argyll seaboard in the Sound of Lorn, just south of Oban. Its landscape has been completely transformed by its quarrying past. This tiny island of 25 hectares has a highest point of just 38m; its major historical quarries are below sea level and, apart from two, are now flooded. Easdale had long been known for supplying slate, mainly as a waterproof covering for buildings, with large-scale quarrying beginning in earnest in the mid 18th century, reaching its height in the 1860s. By 1911, commercial quarrying had virtually ceased on the island.

Our Architecture and Industry team recently carried out extensive field survey and data gathering of the quarrying remains on Easdale. The aim was to create a plan of this industrial landscape, including its quarries, slate waste, building remains, tramways, garden enclosures and associated features. The survey concentrated on the northern, eastern and southern areas of the island rather than the village of Easdale.

The island was divided up into sectors for fieldwork and within these the field team mapped the quarrying-related features. Various methods were employed to capture landscape information, including ground-based and drone photography, Electronic Distance Measuring, plane table survey (for detail), and the creation of field notes. Combining on-the-ground observation, maps and aerial photographic evidence, we were able to build up a phasing of the remains. This formed the basis of a digital map of the historic features, while further office-based work is creating interactive

Easdale Island from the air showing the remains of the quarries and the harbour. DP018001

Roofing the world with Scottish slate

Slate has been one of the most widely used building materials in Scotland for centuries. Easdale was the smallest of a group of 'slate islands', along with Seil, Luing and Belnahua, but it was the most productive, with a community of over 500 working in seven quarries on the island. Slate quarrying was one of the largest industries in Scotland; at its peak in 1895 Scottish slate quarries produced 45,000 tons of slates, much of which was exported, but by the early 1900s production had slumped, largely because the process had not been mechanised in Scotland as it had been in England and Wales, which meant that the regular-sized slates that the building trade required could not be supplied. Slate quarrying finally stopped in Scotland in the 1950s.

maps that will be able to be accessed through Canmore.

Our reports of Easdale are allowing us to experiment with new, interactive ways to bring our data alive, allowing us to make 3D images of the island readily available and to help present the story of this fascinating island in a visually exciting way.

Map of Easdale Island illustrating the different phases of quarrying.

2.3 MIDCENTURY MARVELS

Who lives in a house like this?

Meadowland, Perth. DP285238

Seeing beyond the front door of other people's houses is always a fascinating prospect, whether it's a classically designed country house or an unusual 1990s bungalow. Beyond satisfying our curiosity, however, looking at the way homes have been designed over the years gives us a good insight into the architectural and stylistic trends and tastes of an era or of a design movement, evoking the lives of past generations in a profound way.

These are all factors in our thinking when our Architecture and Industry investigators are looking for little-altered examples of historic or architecturally interesting housing on estate agent websites. 'Point-of-sale' is often the ideal time for us to carry out a survey because houses are usually presented as owners wish them to be seen. It's also the point where period-specific fixtures and fittings (and, if we're really lucky, decoration and furniture) may be together for the last time before a new owner perhaps makes changes. In 2018, we were able to record two architect-designed houses for which this 'set-piece' of design, character and decoration could be captured for the National Record.

Meadowland in Perth was designed by the Scottish architectural practice Morris & Steedman in 1964 for clients Mr and Mrs Leather. When Mrs Leather came to sell the property last year, she kindly agreed to allow our photographers to make a record of her home which had remained little altered, bar a sensitive extension by the same practice in the mid 1970s. Meadowland is an example of a celebrated and influential

Living room, Meadowland, Perth. DP285253

architectural practice at the peak of their powers. An open and spacious riverside site, within the walled grounds of a demolished 19th century villa on the edge of the town, provided an ideal setting for a sleek, elongated design of exposed brick, glass and wood. These materials flow from exterior to interior, where they remain expressed in their raw state within an open plan living space that could be sub-divided by timber concertina screens and that rises to the peak of the house's distinctive wave-shaped roof. We were also able to bring in a set of the original design drawings of the house, which Mrs Leather kindly donated to the National Record to complement our survey.

51 Braid Farm Road in Edinburgh is another stylish and beautifully detailed 1960s house that was recently on the market. The house was designed by the architect Ronald Douglas Cameron for himself and, not surprisingly when the architect is also the client, the result is innovative and stylish. The rectangular geometry of the house's exterior does little to betray the fashionable low curved seating area and double height space at the heart of the house. Paired timber rafters rise steeply from ground floor up to the high timber ceiling, opened onto by a mezzanine dining space. A modular wall design accommodates windows and shelving in round-edged portals on one side of the room, while bench seating, fireplace and entertainment units are housed in the curved side of the living space.

In both houses, the high quality of the materials used, the light and shade created by structure and aperture, and the sight lines that are carefully established in the designs, make for some atmospheric, effective photography that reflects not only the built fabric of these houses but also the character and timelessness of place.

So next time an interesting house on your street goes up for sale or you see an ultra-rare avo-cado bathroom suite on a property website, let us know! We're always on the lookout for unu-sual domestic buildings to record, and you might just see them appear in HES's National Record.

Living room, 51 Braid Farm Road, Edinburgh. DP293581

51 Braid Farm Road, Edinburgh. DP293701

2.4 EAST LOTHIAN LAWS

A trip through East Lothian by road or rail will take you past two noticeable low hills jutting out of the undulating coastal plain – the rounded humpback of Traprain Law, and the pointed outline of North Berwick Law. Both these prominent landmarks bear the evidence of prehistoric and more recent archaeological remains, including their use as fortifications. They have recently been surveyed in detail by our archaeologists, in both cases taking into account the work of previous surveyors and the results of excavations over the last century.

Traprain Law is the site of the discovery of a spectacular treasure – some 22 kg of Roman silver, battered and hacked up into pieces, which was uncovered by workmen during an excavation 100 years ago. It was found among the ruins of 'native' buildings on the summit of the hill and was buried in the 5th century AD. This find underlines the importance of Traprain, which is one of the two largest prehistoric hillforts known in Scotland. Our archaeological survey has documented at least five phases of defensive walling that can be traced on the surface, expanding from a summit enclosure in the Bronze Age to a much larger fort in the Iron Age, and eventually contracting during or after the Roman occupation of Scotland. We think that at least some phases of these forts contained large numbers of buildings; some are visible as platforms on the surface, but others may only be found through excavation below the modern ground surface. The Law is a prominent landmark, which clearly made it an important place through much of prehistory. It continued to be used for many generations – including as a source of rock, most obviously in the huge modern quarry which only closed in 1976, having taken away a tenth or so of the hill with the aid of dynamite!

The survey of North Berwick Law took in the whole area of the pointed hill which looms over the adjacent seaside town. This hill also hosts a fort, much smaller this time and limited to the rocky summit. Lower down on the southern flank, the visible remains of later prehistoric houses and fields survive, a very rare occurrence in East Lothian. New discoveries during the survey include some rock carvings of Neolithic or Early Bronze Age date known as 'cup marks'. Much later features at North Berwick include a bank around a plantation of trees created in the 18th century to celebrate the union of Scotland with England. Among the structures on the summit is a well-preserved Napoleonic signal

Traprain Law at sunrise in February. DP285965

station and the famous whalebone arch, a version of which has stood here since at least 1789.

Combined with careful fieldwork and analysis of 3D data, our work on the Laws has allowed us to create detailed plans, descriptions and interpretations of the sites. This provides an up to date record of these prominent monuments, and a basis for the future interpretation and management of these special places. The surveys of the Laws were carried out in partnership with East Lothian Council, who will be using the results for interpretation and management.

What are cup marks?

The cup marks on North Berwick Law are examples of a simple but beautiful type of rock art found in many parts of Britain and Europe. A few Scottish examples are incorporated within structures of Neolithic and Bronze Age date, giving us an indication that they are around 4,000 to 6,000 years old. We know little of their meaning, but the example on North Berwick Law takes in a spectacular view, and represents the earliest marks made by humans on the hill.

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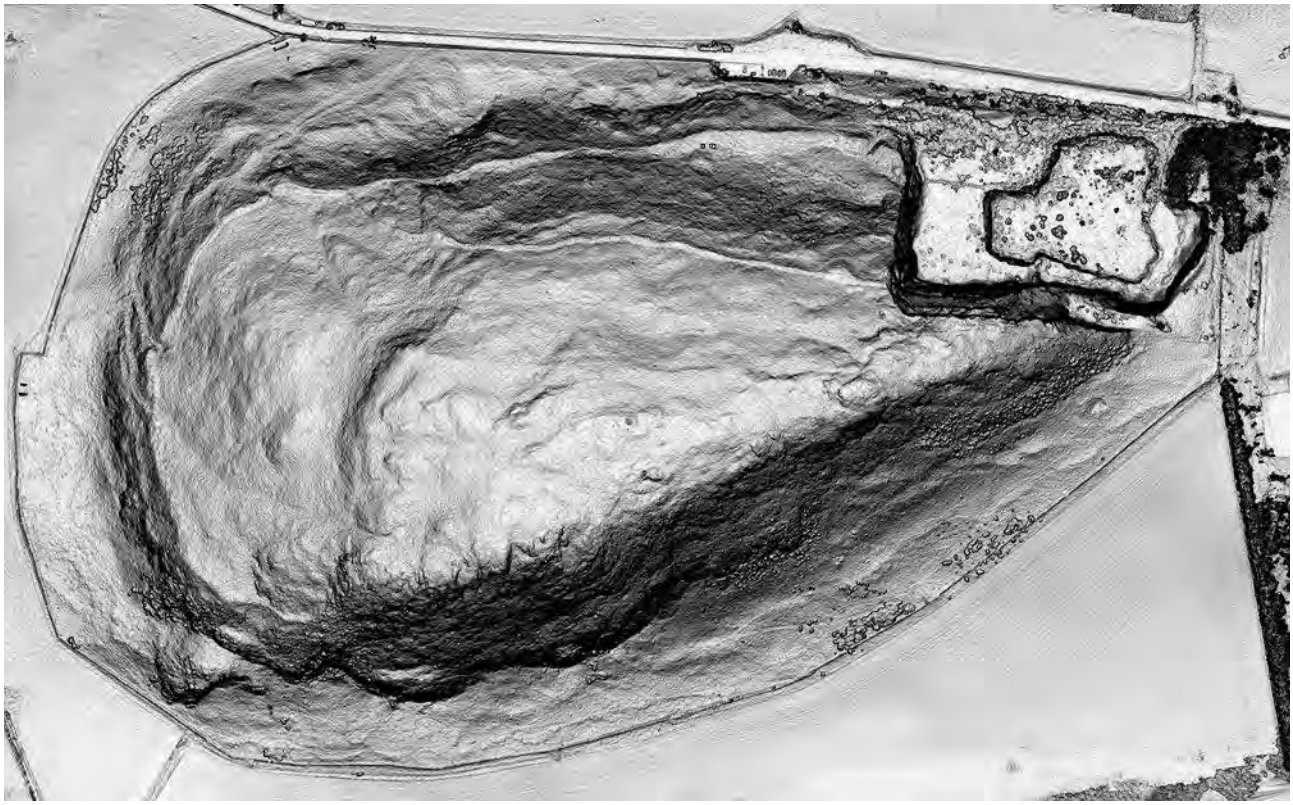
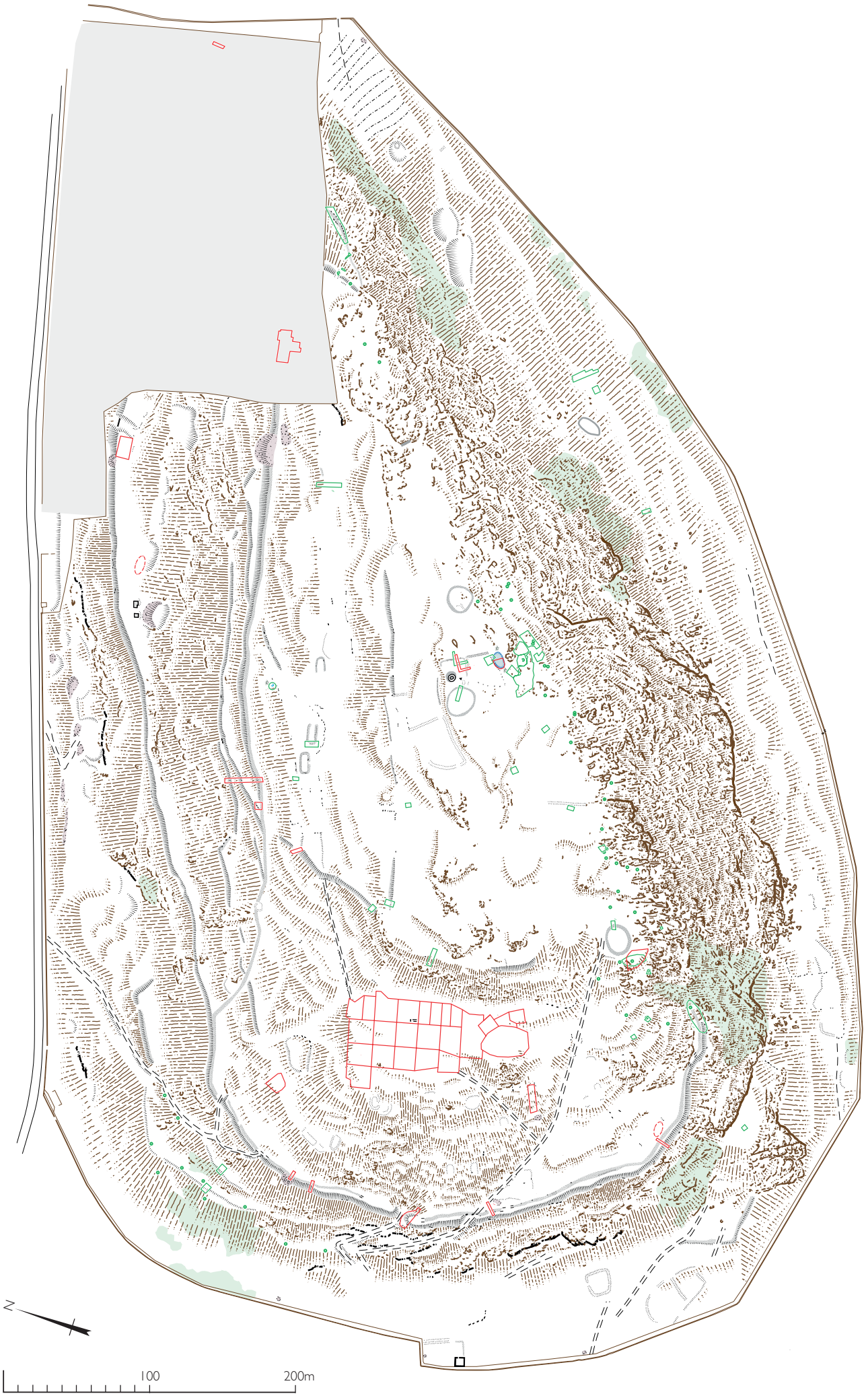
Cup-marked stones on North Berwick Law. DP285042

3D computer model of Traprain Law. DP298194





16 **Site plan of Traprain Law.** SC1838756

2.5 CROPMARKS GALORE

Summer 2018 was a memorable one – one of the hottest and driest on record – and that made it a busy time for the HES aerial survey team. For over 40 years we have been surveying lowland areas, looking for the remains of ancient settlements, burials and other archaeological sites buried under the topsoil. The success of this work depends very much on how dry it is, and how stressed the arable crops (or grass) are. That's because with dry conditions plants react strongly to local variations in soil depth – and so the crop growing over the buried remains of an ancient ditch will develop differently from the area around it that has less topsoil.

When the weather hotted-up in 2018, lots of cropmarks developed as the vegetation reacted to the dry conditions. A spectrum of greens and yellows in arable crops revealed long-buried ditches of prehistoric settlements and Roman forts, and boundaries around ancient burials. Conditions had not been so good for cropmarks since the scorching heatwave of 1976, so we spent about 40 hours surveying from a light aircraft, recording over 400 ancient sites for the first time. In some cases, we spotted sites that had not been seen since 1976, so we were able to add extra detail to our existing records.

Parts of the north-east and some stretches of the Clyde and Tweed were very dry, producing evidence of ancient settlements. So far, these conditions are rare in Scotland with only very intermittent 'bonanza' years, but over the past four decades ongoing aerial reconnaissance has recorded nearly 10,000 archaeological sites that would otherwise have gone unnoticed in arable fields and ground set to pasture. Perhaps even more than most people, we're looking forward to Scotland's next long, hot, dry summer!

A prehistoric settlement at Moneydie, Perth and Kinross. DP281320

The corner and entrance to a Roman temporary camp overlain by the marks of geology and cultivation at Forteviot, Perth and Kinross. DP280240

2.6 DEFENDING GLASGOW AND THE CLYDE

Many people in Scotland will have heard of the Clydebank Blitz and the terrible destruction it caused during the spring of 1941, but how many are aware of the huge effort that went into defending the factories, shipyards, docks and those who worked along the Clyde against attack from the air? From 1939, heavy and light anti-aircraft batteries, rocket launching batteries, searchlight stations, decoy sites, mine-watching posts and anti-glider defensive ditch systems were constructed, and barrage balloons deployed to deter low-flying aircraft. This defensive blanket, supported by a squadron of night fighters stationed at Ayr, has been the subject of our Aerial Defences of the Clyde project.

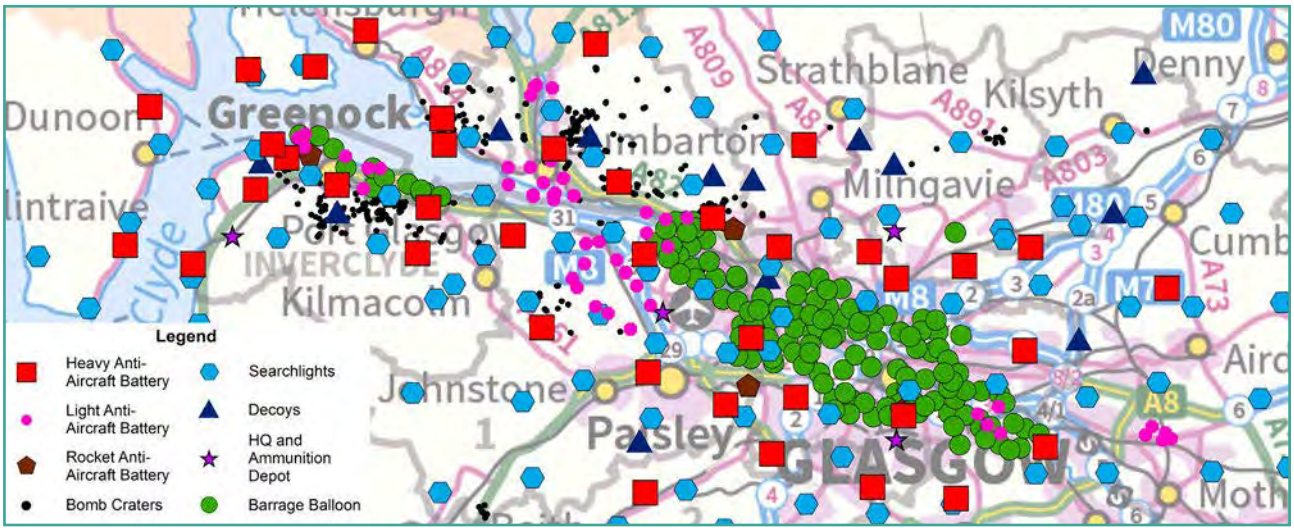
Once the war had ended, building materials were in short supply and so many of these defensive structures, especially the prefabricated huts, were dismantled to be used elsewhere; others were re-used where they sat or simply left to decay. Much has disappeared but by using evidence from contemporary maps, military reports and aerial photographs, we were able to investigate the scale and nature of the structures and work out what survives today.

The number of installations shows how seriously the defence of this key part of the country was taken; within seven miles of the river Clyde, 46 heavy and 60 light anti-aircraft batteries were constructed, each accompanied by a camp housing up to 200 personnel. The camp buildings are now usually reduced to their concrete floors and very little is now evident of the associated radar installations. Surviving remains of light anti-aircraft batteries are even scarcer, with earthworks and perhaps the occasional office building known at only half a dozen sites. There is now no trace of the six rocket launching batteries that we know about from maps and documents, nor of the 140 searchlights batteries which tracked aircraft and illuminated them as targets from Loch Lomond to Bute and Airdrie, other than the remains of some ancillary buildings.

More than 120 barrage balloons, tethered by steel cables to circular concrete standings and raised to an altitude of up to 5,000ft (1,524m), were floated along both sides of the river to deter low-flying aircraft. The site of one on Glasgow Green can be seen in concentric rings of shallow pits, each of which indicates where a concrete anchoring block

This oblique aerial image of John Brown's Shipbuilding Yard on the River Clyde was taken by the Royal Air Force as part of the post-war National Air Survey of the UK in 1950.

RCAHMS: RAF National Survey (Air Photographs) Collection SC1024489



Map showing the extent of the aerial defences of the Clyde.

has been removed. Although nearly all the barrage balloon sites have been erased, the remains of a depot and training site for the balloon operators still survives east of Low Moss prison. Except for their concrete floors, the hangars that housed the balloons have gone, as have most of the ancillary buildings, but the ground plan, including the road system and the anchor points for three balloons, is still visible.

Diversion was also used as a defensive tactic with the use of 16 decoys placed on high ground away from the river. With dramatic displays of fire and light, they were intended to mimic bombed and burning townscapes, thereby drawing the enemy away from potential targets on the Clyde. Several water-filled bomb craters at Auchenreoch show that this strategy succeeded in fooling the Luftwaffe some of the time.

We have, for the first time, mapped the remaining evidence of this important episode in the history of the Clyde. By 2039 very little is likely to have survived but the record of what exists in 2019 will be preserved for posterity in the National Record. The results of our survey programme will, we hope, contribute to the remembrance of these remarkable efforts when the centenary commemoration of the Second World War begins, twenty years from now.

Bomb crater showing the success of the Auchenreoch decoy.
DP308237

A barrage balloon mooring point at Newshot Island, River Clyde.
DP258632

3. TECHNOLOGY AND INNOVATION

Historic Environment Scotland is well placed to explore innovative ways to look for, record and interpret information about our past, and to use technology to help make that information easier for people to discover and understand. Our rapid archaeological survey of **Arran** is an example of how we are exploring 'computer vision' and using new developments in airborne laser scanning to speed up the time it takes to survey large areas. 'Machine learning' is being used to delve into our database of hundreds of thousands of records, to make them more informative. We are pushing the boundaries of what we think of as 'heritage', looking at historic and contemporary **graffiti** to invite people to think differently about it, and how the 'everyday of today' might be of interest to people now and in the future. We have also started to use **drones** for exploring sites and buildings, creating videos and 3D models that can be used for interpretation and conservation.

3.1 AUTOMATING ARCHAEOLOGY WITH AI

Artificial Intelligence (AI) is everywhere – working away in the background in apps on our phones, and increasingly in our homes and our cars. Not only is AI being developed to make sense of vast amounts of information, it is also demonstrating huge potential for problem-solving and is evermore capable of 'learning' – characteristics that we usually associate with being human. For these reasons, our archaeologists are looking at ways in which AI might help in many routine tasks such as the identification of archaeological sites in remote sensed datasets like Airborne Laser Scanning (ALS, also known as Lidar).

Traditionally, finding sites on ALS-derived images (or visualisations) would depend on a person painstakingly looking at them, panning slowly across the landscape and marking things of interest. Using AI and 'convolutional neural networks' (CNN) we've experimented with how these techniques can help us analyse this 3D landscape data, to draw out patterns relating to the historic environment that would be too time-consuming for human interpreters to find, or which could even be missed entirely by human eyes.

A pilot project with the Norwegian Computing Center, on the isle of Arran, using freely available ALS data, has shown the potential of this approach. This study produced some very good results when looking for the remains of prehistoric roundhouses but also total chaos in some parts of the island where the natural lumps and bumps create too much 'noise'. This is an interesting result because, like a human archaeologist, the computer needs to learn how to 'see'. As we develop this approach in partnership with computer scientists over the next few years the challenge will be to work out how we (people) see and identify things, and how we use AI to work alongside us.

What is Airborne Laser Scanning (or Lidar)?

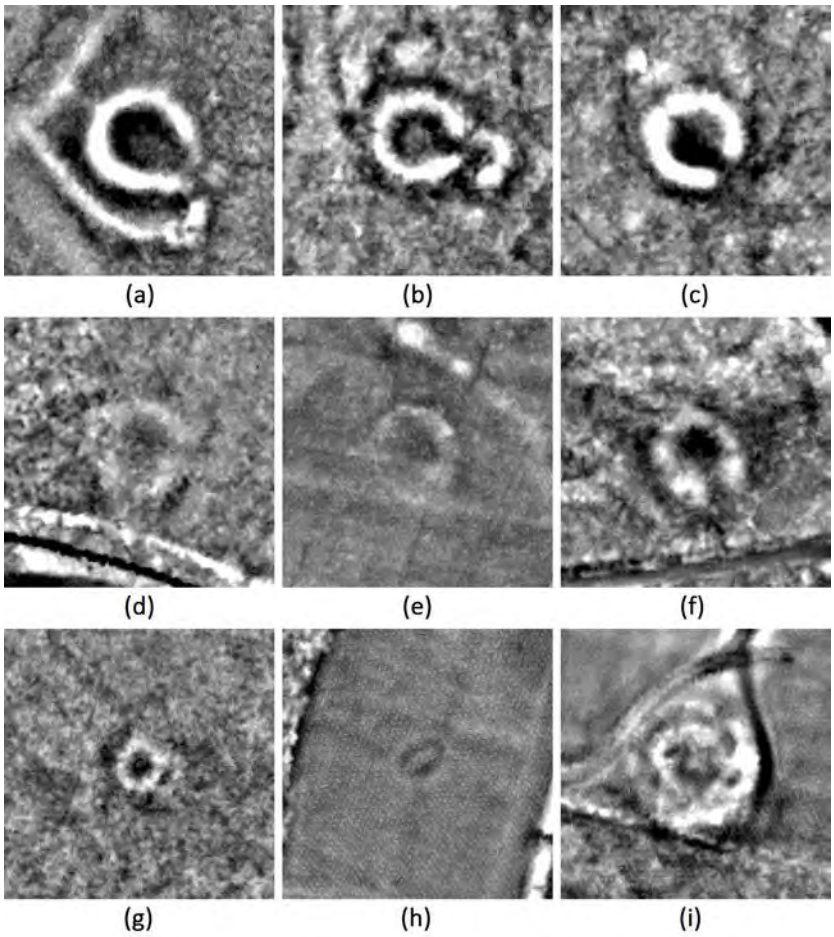
Airborne Laser Scanning (ALS), sometimes also known by the acronym LiDAR/Lidar (Light Detection and Ranging), does exactly what the name suggests. A laser, usually mounted in an aircraft, sends out pulses that are bounced back from the ground surface, or trees, and, after processing, provide a detailed digital model of the ground surface. These digital surface models can be further processed to provide visualisations that allow us to look at the surface humps and bumps – natural landforms as well as archaeological sites – in a wide range of ways, including adjusting the direction and angle of lighting.

'Scotland in miniature' captured in 3D by Airborne Laser Scanning allows us to look at the island as a whole, and to focus on the detail to see the footings of prehistoric roundhouses, remains of cultivation and small heaps of field clearance.

This is important for several reasons. Firstly, the systematic creation of archaeological information forms the foundation for how we understand the past, how the remains of the past are managed and how this information informs the writing of our history. But the availability of systematic archaeological survey data across Scotland is patchy and we hope that AI will help to speed up consistent data gathering over large areas. The availability of data like ALS is growing all the time and as this data grows in volume it is becoming clear that we cannot keep pace with it using traditional human analytical methods because too many people would be required to do the work. So, if we are to speed up the process of analysing this data, we will need to harness AI. Thinking about how we work with AI has another advantage: it forces us to be really clear about what we, as archaeologists, see. And that makes thinking about how best to work with AI really fascinating.

What are Convolutional Neural Networks (CNNs)?

Computer vision is a scientific field concerned with gaining understanding from digital images, basically trying to automate things that we use our visual system – our eyes and brains – to do. Within this general field, convolutional neural networks have proved very effective for picking out things of interest from images, for example in facial recognition. Such 'image classification tasks' are one of the key things that archaeologists do when they look at images, and that is why we're exploring how CNNs can help us undertake archaeological survey more efficiently.



Roundhouse footings and other types of remains in the Machrie Moor area of Arran. The roundhouses (a)–(c) in the top row were correctly identified by the CNN, while those in the middle row, (d)–(f), were not, perhaps because they are less bold. The bottom row shows a small hut (g), a modern cattle feed stance (h) and a circular burial cairn (i), which were misidentified as roundhouses (g and h) and a shieling hut. These results show the challenges of using computer vision effectively, but also how good the results are at this early stage.

3.2 RECORDING GRAFFITI

Graffiti by Smug at the ruins of Pollphail industrial village, Argyll and Bute. DP239009

Graffiti is evidence of people's engagement with places – remnants of past events and culture that are drawn, scratched, stencilled, etched and sprayed across our historic environment. Over the past couple of years our staff have been surveying, recording and learning about a broad range of graffiti that exists across Scotland. They've looked at graffiti written in the military prisons at Edinburgh Castle, at political slogans painted on boulders at Dumbarton Rock, and at contemporary street art festivals that illustrate how and why we make our mark today.

2018 was a busy year testing recording forms to document the variety of different types of graffiti, creating collaborative outputs and developing new partnerships. The recording form was devised and trialled so that it could be used by HES staff in our Properties in Care to document graffiti on our own estate, and staff at Stirling Castle were happy to act as our guinea pig. With the assistance of property staff, some fascinating graffiti from a range of locations was recorded. Following this success, we will continue working with staff at Stirling Castle, Glasgow Cathedral and other properties in the care of HES.

A collaborative project with researchers from Glasgow School of Art (GSA) on Scalan mills, near Tomintoul in Moray, allowed us to explore a truly amazing collection of historical graffiti dating from the 1870s to the 1950s, providing a unique, unofficial history of the people who lived and worked there. Together with the GSA artists we used a broad range of recording methods to deepen our understanding of these past lives. We contributed to the Tomintoul and Glenlivet Landscape Partnership's programme of events with an open day at Scalan, at which over 40 people braved the wintry weather to share their memories of the place.

In Aberdeen, over the past three years the city has hosted a highly successful street art festival called Nuart. As a result of the festival, which brings international artists together to paint walls across the Granite City, a wide variety of street art and graffiti is accumulating. We visited in 2018 to record the examples from recent festivals, and it became clear that, as well as the 'official' festival examples, there were far more examples of street art

appearing on city walls. As a result of our visits and through social media we began to meet a range of artists, who helped the team to record and understand this aspect of Aberdeen's streetscapes.

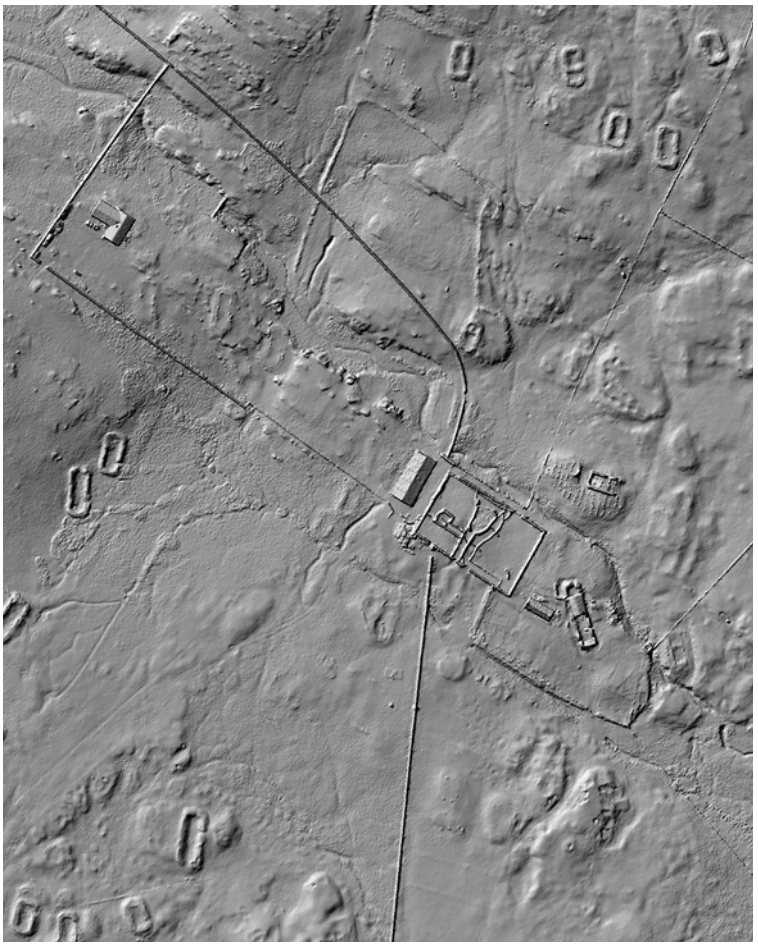
Social media has been an essential part of this project, broadening engagement with members of the graffiti community. It has helped us to understand more about the material culture of contemporary graffiti, discuss the range of writing styles, and learn more from a community of practice. Both the Twitter and Instagram pages have been very useful in engaging with a broad range of multi-disciplinary experts interested in the topic, in Scotland and beyond. We are continuing to engage with artists and academic communities as we explore the possibilities of transcribing some of the historical graffiti that we've recorded and would like to know more about.

'Super Scurry' by Ciaran Globel and Conzo Throb, Willowbank Road, Aberdeen, created for the 2018 Nuart Aberdeen street art festival. DP282343

3.3 EYES IN THE SKIES: USING DRONES

The medieval St Finnan's Chapel, Eilean Fhianain, Highland.
DP249995

Drones (or UAVs) are everywhere. While many of those given as Christmas presents may be crashed by the New Year, there's no doubting their boom in popularity. Beyond 'hobby' use, their application is routine in many sectors, including precision agriculture, film-making, military, and of course archaeology. They are a cost-effective tool to capture photographs and video. The flexibility to fly to a height of 400ft in a range of light conditions can produce stunning results, bringing a dramatic perspective that can be difficult to achieve from the ground or from much higher altitudes. In addition, processing of images through software packages to produce digital 3D models brings what used to be a highly technical and expensive process within the reach of anyone. For these reasons we have been working with UAVs for a few years now, thinking about how they fit in with our developing approaches to archaeological survey, complementing other aerial and ground-based methods and datasets.



RIGHT
3D visualisation of a farming landscape on Pabbay, Western Isles, created using multiple UAV images.

The ability to take low altitude photographs brings a huge benefit, allowing us to combine detail and dramatic perspectives, as can be seen from the examples shown here. These types of images work in tandem with those taken from light aircraft or, like Google Earth, available as vertical images, to give us an incredibly useful range of perspectives on sites and landscapes in different conditions and at different scales. While digital topographic data like Lidar is becoming more widely available, it is of variable resolution and has patchy coverage. So, the ability to easily collect images that allow us to produce a highly detailed 3D model to inform interpretation is a great boon.

Pabbay, Western Isles. This UAV image was one of multiple used to create the 3D visualisation overleaf. DP296566

4. SHARING OUR RESULTS

While a core purpose of our work is to add to the National Record of the Historic Environment, we also present our discoveries in other ways in order to reach as many people as possible. We believe that Scotland's historic environment can be interesting to everyone, whether you're an expert working at a desk, someone who has a thirst for history when going to museums and galleries, or someone who likes to see a bit of archaeology on television. For our long-term project on **Historic Land-use Assessment** we created a valuable, technical resource for professionals managing the land, but also produce a detailed online publication to share the results further with these experts, plus a book on Scotland's landscapes for everyone to enjoy. Since much of our work is visual, exhibitions have proved an effective way to meet new audiences: **Visible Girls – Invisible Spaces** and I**ndustry + Aesthetics** were exhibitions that invited the public to participate and took highly creative approaches to how we all see and respond to the historic environment.

 Industry & Aesthetics exhibition. DP282676


+
« Disgust with modern art/ industrial type architecture creeping into our living spaces »
« The 'ugly' becomes beautiful and poetical »
-

4.1 MAPPING PAST LANDSCAPES

In 2018–19 we released two major publications that share the knowledge gained through the Historic Land-use Assessment (HLA) project. The first, A History of Scotland's Landscapes, written by medieval historian Fiona Watson (Universities of Stirling and St Andrews) with our own Piers Dixon, was the subject of a meet-the-authors event at the 2018 Edinburgh Book Festival. We then published a second, more detailed companion to the HLA dataset in digital format.

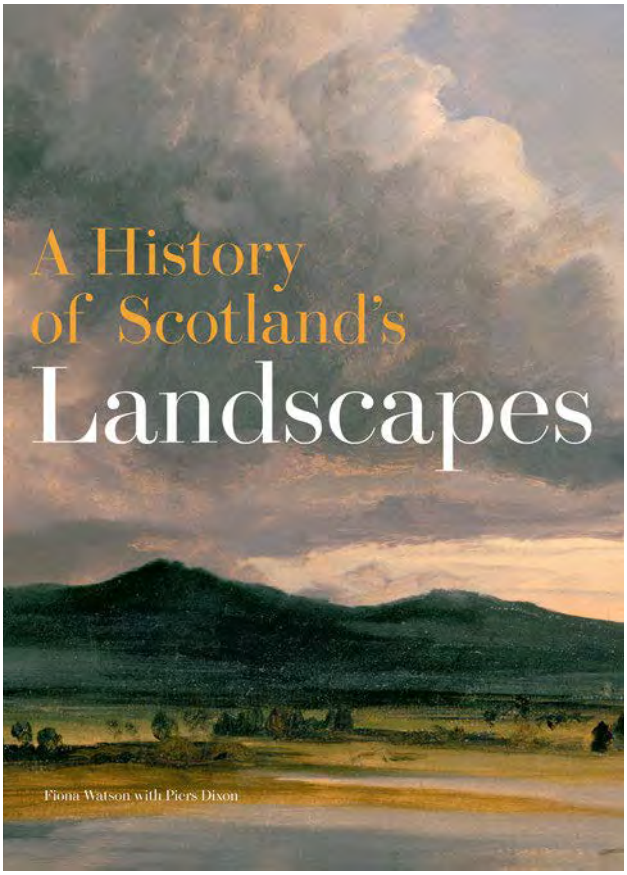
What is HLA?

The Historic Land-use Assessment project is a Scotland-wide view of land-use in modern and past times. As well as enabling us to visualise recent land-use change the HLA map also reveals the extent of surviving prehistoric, historic and modern land-uses.

It is easy to overlook how much of our history is preserved all around us – the way the everyday life of bygone days has been inscribed in fields, forests, hills and mountains, roads, railways, canals, lochs, buildings and settlements. Footprints of the past are to be found almost everywhere. The shapes of fields may reveal the brief presence of the Romans, or the labours of medieval peasants, while great heaps of abandoned spoil or the remains of gargantuan holes in the ground mark the rise then rapid decline of heavy industry in the recent past.

These evocative spaces provide unique evidence for the way this land and its wealth of resources has been lived in, worked on, ruined, abandoned, restored and celebrated – offering valuable clues that can bring the past to life far more effectively than any written history.

A *History of Scotland's Landscapes* explores the many ways that we have used, adapted and altered our environment over thousands of years. Full of maps, photographs and drawings, it offers a remarkable new perspective on Scotland – a unique guide to tracing memories, events and meanings in the forms and patterns of our surroundings.



The second companion to HLA was written by HES staff Piers Dixon and Lesley Macinnes and is available for download as a pdf through the HES website. The book explores the many ways that we have used, adapted and altered our environment over thousands of years. It allows you to drill down into these landscapes, examining the details of the HLA 'land-use types', and including short essays on each by expert authors. This volume is for those interested in getting under the skin of our landscapes, analysing the relationship between past and present, and finding out some of the reasons why the landscapes we have inherited look as they do. This level of understanding is essential in managing our changing landscapes, and also in drawing out the stories locked within them. The publication is not just about the past: Historic Land-use Assessment is also being used to analyse how landscapes are changing over time, particularly in light of climate change.

4.2 THE EYE OF THE BEHOLDER: SEEING BEAUTY IN INDUSTRY

Can industrial sites and monuments be considered beautiful or do they stir up other emotions? How do we react to industries which may no longer exist? Is it with a feeling of nostalgia, a sense of belonging, negativity, discomfort or loss? Does thinking about industry in this way help our understanding of industrial heritage? In June 2018 our Industry + Aesthetics exhibition was opened at Dundee's Verdant Works before moving on to the Scottish Maritime Museum in Irvine. The creation of this exhibition marked a departure for HES.

The exhibition invites the audience to re-examine their attitudes and feelings towards the industrial heritage of Scotland. Through a crowdsourcing exercise, we asked a group of people to note words and statements that described their reaction and emotion to photographs of various industrial sites. This formed the basis for an exhibition text that highlights the complicated and nuanced relationship between aesthetic qualities, industrial places and perceptions of heritage. The images of the exhibition show that our photographic records, while primarily motivated by understanding of industrial places and processes, can also capture artistic and emotive values that contribute to our aesthetic understanding of industrial heritage beyond traditional views.

As part of the exhibition programme, our photographers, who travel all over Scotland to record the places where people work or worked, led workshops with locals and students in Irvine, challenging them to make their own images both to develop their photographic skills and to capture the themes of the exhibition.

The exhibition will tour Scotland into 2021, taking in as much of the country as possible. Venues in Edinburgh, New Lanark, Falkirk and Grangemouth have already agreed to take the show and we hope that it will engage local people and visitors alike in these places, introducing a new way of seeing Scotland's rich industrial past.

Industry & Aesthetics exhibition on display at Verdant Works, Dundee. DP282681

Welding bench at Ferguson Ailsa Shipyard, Port Glasgow. DP069330

Mayfield Brickworks, Carluke. DP109783

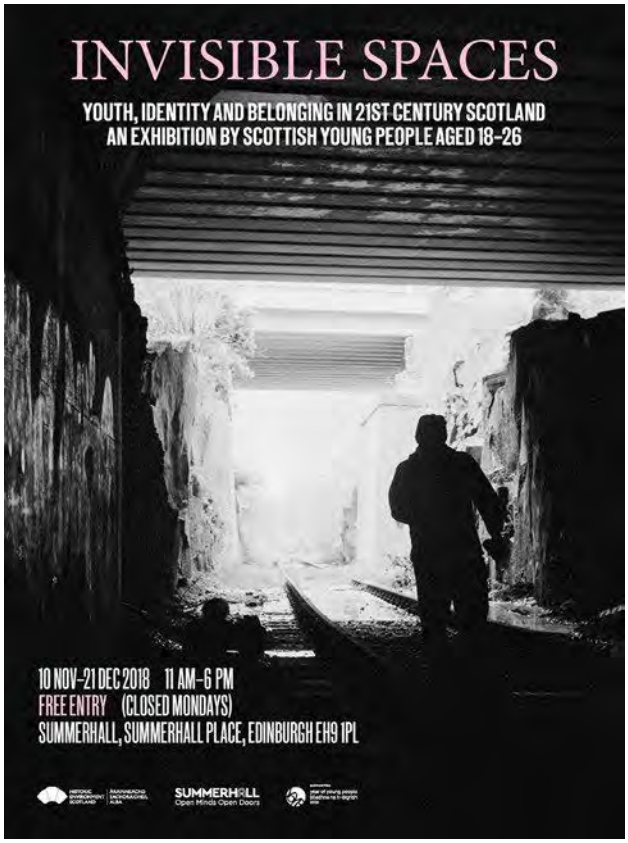
4.3 VISIBLE GIRLS – INVISIBLE SPACES EXHIBITION

What are the places that matter to you? They don't have to be things like castles, cathedrals, standing stones or large houses; they can be the spaces that form the backdrop to your everyday life, your walk to work or where you do your leisure activities. This was the question that we asked twenty-nine 18–26 year olds as part of our 2018 Year of Young People project 'Invisible Spaces'. It led to the creation of an exhibition that ran for six weeks in November and December 2018 at Edinburgh's Summerhall, allowing us to showcase young talent and invite discussion of why we should share and celebrate our very recent past.

The exhibition was designed to accompany English photographer Anita Corbin's acclaimed touring exhibition Visible Girls: Revisited, which we brought to Summerhall for its first ever showing north of the Border. This exhibition portrays pairs of young women in 1981 and includes all of London's tribal fashions of the era: punks, mods, skinheads, soul girls, Rastas and New Romantics. Thanks to the images re-emerging online, Corbin has been able to reunite her subjects for a second photograph some 37 years later. The images and accompanying interviews reveal their journeys through life, how their goals, their aspirations and their values have changed or remained the same, and the personal, political and social changes they've witnessed, from being young women clubbing in London in the early 1980s to becoming older and wiser.

As custodians of the National Record we were initially interested in the backdrops behind the figures in Corbin's images – the thick paint of the youth club walls, the interior design of the nightclub toilets or the contrast between the dark streetscapes of Thatcher-era London and the lit, CCTV-enhanced urbanity of the now. Our attraction to Visible Girls: Revisited also mirrored our Architecture and Industry team's recent recording of the Studio 24 nightclub and the indie music store Ripping Records prior to their closure, both Edinburgh institutions that represent aspects of our intangible cultural heritage.

First Minister Nicola Sturgeon talks to artist Mina Omarchevska at the launch of Visible Girls – Invisible Spaces at Summerhall, Edinburgh. © Neil Hanna



Recording and reflecting upon Asian and African spaces: Inzajeano Latif photographed the Al-Farooq Education and Community Centre in Govanhill while Natasha Ruwona documented African hair salons and shops selling exclusively ethnic hair products.

Licensor www.scran.ac.uk © Inzajeano Latif © Natasha Ruwona

The Invisible Spaces collective worked with us and our colleagues in HES's Learning and Inclusion team. They took inspiration from the youth culture of Visible Girls and images created by HES survey staff such as photographs of gyms, 1990s housing estates and graffiti, as well as imagery from Victorian and Edwardian times in HES's Archive – once contemporary photos but now viewed as historical documents. The subject matter within the exhibition included beauty parlours, Glasgow nightlife, playgrounds, spaces where 'parkour' happens, and multi-storey car parks. Also documented were contemporary concerns such as homelessness, the lack of diversity in commemorative sculpture, transient living, and the importance of mental health.

The exhibition became the subject of a session at the Edinburgh International Culture Summit, allowing six of the young people to talk to an international audience about what the project meant to them. Nicola Sturgeon, First Minister, gave a speech at the opening night in November 2018, after which over 2,700 people visited the exhibitions and took part in associated educational activities, some of which were run by the participating artists. These included a discussion session on how the ever-changing face of our social places can be represented in a National Record of the Historic Environment.

Friendships were formed and several of the Invisible Spacers have stayed in touch in the months after the project. We hope that the project nurtured a shared passion for all aspects of the historic environment. Both Visible Girls: Revisited and Invisible Spaces were photographed *in situ* at Summerhall, and that record in now available online via Canmore.

The individual works of art created by the participants were also documented and have been preserved for posterity on HES's Scottish Cultural Resources Access Network at scran.ac.uk.

5. ENGAGING AND EMPOWERING COMMUNITIES

One of our key aims is to share with people what we do and what we've learned, even if they perhaps don't usually feel that they are interested in archaeology, architecture or landscapes. Our **Celebrating Speyside** project was a way of showing young people the interesting places around them, to share some of the stories and histories connected with them. The longer-term **Scotland's Urban Past** project, generously supported by the National Lottery Heritage Fund, also had a focus on young people, as well as those already interested in heritage, but took us further by engaging with people who had come together for different reasons. In doing these projects we learned a lot about how to capture the imaginations of groups that maybe don't think about how the historic environment can enrich their lives. Along with colleagues across our organisation, we work with many community groups that are recording, caring for and being the champions of their local heritage, which is why we support and help organise the annual **Scotland's Community Heritage Conference**. The big pull of this conference is that most of the talks are given by community groups themselves, sharing what worked and what didn't, as well as speaking to experts from archaeologists to archivists, and sometimes forming long-lasting associations between people with a passion for the past.

5.1 CELEBRATING SPEYSIDE

As part of our celebrations for 2018, Scotland's Year of Young People, we spent the 2018–19 school year working with primary schools along the River Spey, encouraging pupils to explore their local history and heritage through projects tailor-made for each class and designed with the help of the children themselves.

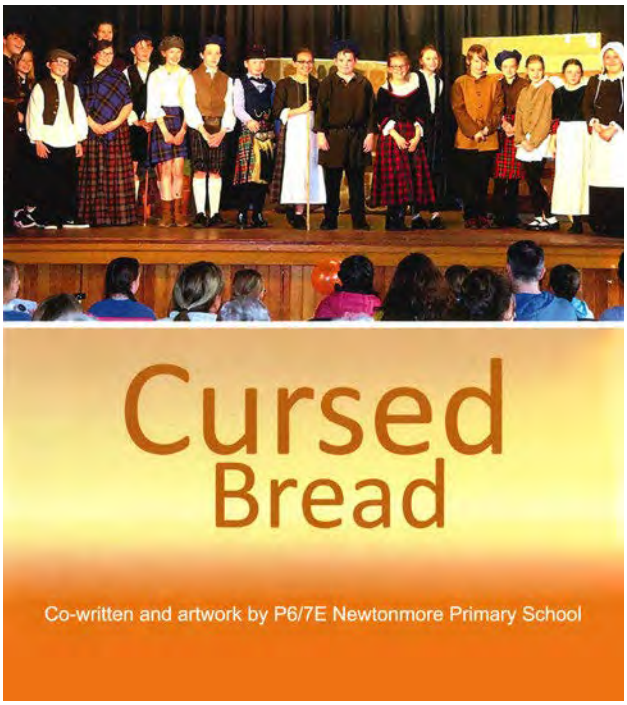
In Celebrating Speyside, we worked with fifteen schools along the river, from Newtonmore Primary School in mountainous Badenoch to Mosstodloch Primary, where the Spey reaches the sea. Hundreds of pupils learned how exciting it can be to explore their own local history. They also showed us how much enthusiasm future generations have for discovering the past.

The emphasis has been on young people telling us about what matters to them and how they would like to celebrate it. A highlight of this project included a play, written and performed by children in Newtonmore, about a bewitched mill, whose ruins still stand on the edge of the village. In preparation for the performance the class visited the mill and also the Highland Folk Museum, where they learned about Highland life in the 18th century, and they now have plans to do their own archaeological survey of the ruins. Most importantly, the children have breathed new life into an old local tale that was in danger of being forgotten.

Meanwhile, in Grantown-on-Spey, primary pupils mounted an exhibition at the local museum showcasing the town's history, with innovative exhibits ranging from models of some of the buildings to a Historic Grantown Edition of Monopoly! Other schools have helped record the history of the places they know or have taken part in medieval re-enactments at Balvenie and Rothes Castles. The climax of the project, though, came in spring 2019, with a 'Heritage Happening' in Kingussie and Newtonmore, where young people and adults were welcomed in for two days of activities, drama and exhibitions.

One of the most exciting aspects of the whole venture has been the willingness of colleagues across HES and from other organisations to join in.

Medieval re-enactment in action at Rothes Castle!



The Cursed Bread was a play based on a local legend which was co-written and performed by P6/7E Newtonmore Primary School.

From other parts of HES, stonemasons, archaeologists, surveyors and architects offered training and encouragement; castle stewards opened their gates out of season and colleagues loaned everything from period costumes to Virtual Reality headsets. Archaeology Scotland gave lots of support, including Heritage Hero Award certificates for many participating pupils, while the Highland Folk Museum, Grantown Museum and the Clan Macpherson Museum became enthusiastic partners too.

Celebrating Speyside has shown us how much can be achieved in a short space of time when our young people are offered a chance to direct their energies into engaging with their past, especially when we encourage them to focus on the pasts that created their places, their homes.

RIGHT

Grantown Primary School pupils learnt perspective drawing for an exhibition that they created for their local museum.

Pupils from Glenlivet Primary School chose to find out more about Balvenie Castle.

5.2 SCOTLAND'S COMMUNITY HERITAGE CONFERENCE

Scotland's Community Heritage Conference is an annual celebration of the vibrancy of community heritage activity across the country, delivered by a partnership of HES, Archaeology Scotland, the Scottish Council on Archives and other organisations. Since 2012 it has provided a setting for community groups to meet with each other and with the professional sector, forming and strengthening partnerships in order to explore, record and value our heritage more effectively.

The conference has established itself as a prominent fixture in the heritage calendar and has attracted speakers from across Europe and from the USA. Survey and Recording staff have been involved in the event since its infancy, with our Engagement team and staff from our Scotland's Rural Past and Scotland's Urban Past projects often encouraging and supporting participants.

To date, the conference has given a platform to around 200 talks, workshops, panel discussions, walking tours and site visits. The talks are usually given by volunteers from local communities; this is their opportunity to promote the important contribution they make to our national heritage. The talks have covered an impressive range of topics: archaeology, architecture and urban history, industrial heritage, oral history, and, more generally, the role of heritage in fostering economic and social regeneration – a theme that has become increasingly visible in recent years. There is some space for professional voices too, especially in offering workshops and training. Topics covered here include IT and technology skills, project development and funding, recording techniques and oral history. To date, over 30 public bodies and professional organisations have made presentations at the conference, underlining the recognition of its value across the heritage sector.

But the beating heart of the conference has always been the marketplace of stalls and displays, brought from all over the country by delegates to promote their particular slice of our national story,

Ready and waiting - delegates at the Engine Shed, Stirling.

around which delegates gather, teacups and cake in hand, to watch and learn, listen and debate.

The conference has been held in various venues around Scotland, from Ayr to Aberdeen, but in November 2018 it landed at the Engine Shed, HES's exciting resource next to Stirling railway station. Here, a sell-out audience heard talks and discussions on projects from Eyemouth to Lewis; they huddled in 'The Snug' to debate issues with PhD students; and they stepped outside for discussions in a vintage bus on the heritage of ring-net fishing in the Firth of Clyde, or to view a reconstructed Nissen hut, brought for the day from the Second World War POW camp at Cultybraggan.

Look out for Scotland's Community Heritage Conferences, which take place each November, the venue for the 2019 conference being Birnam, Perthshire.

RIGHT
The Archaeology Scotland Summer School at Logie Old Church, Stirling, on the cover of conference programme.

A reconstructed Nissen hut from the World War II POW camp at Cultybraggan gets a day out at the Engine Shed.

5.3 TALES OF URBAN PASTS

Scotland's Urban Past (SUP) is a five-year National Lottery Heritage Funded programme that enables communities to research, record, share and celebrate the heritage that matters to them in the nation's towns and cities. 2018–19 saw the programme move to its final year and the work in this period shows not only the vast amount of training that the dedicated SUP team delivered but also the sheer variety of interests that communities, old and young alike, have in their historic environment.

Locals from Lerwick recorded some of the best-preserved Second World War defences left in Europe following their training from SUP. Working alongside archaeologists from HES and Archaeology Shetland, they researched and documented the military structures using digital survey technology.

As hosts of the 2018 World Down Syndrome Congress, Down's Syndrome Scotland wanted to work with SUP to create a warm welcome for their international visitors. Conference organisers created a community map for the three-day event, taking photos of their favourite city sites and working with local artist Jenny Speirs to make a set of postcards that were given out as souvenirs.

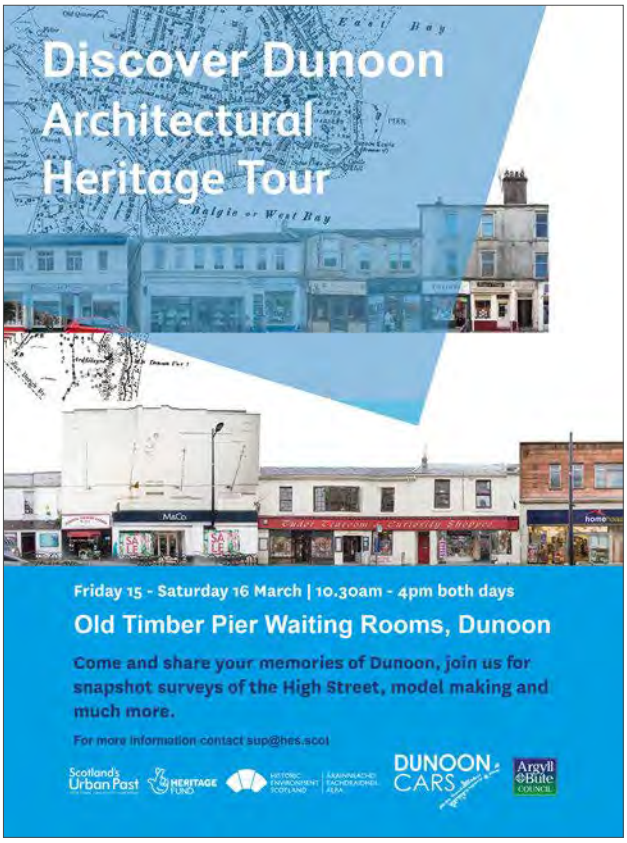
RIGHT
Archaeology Shetland team members examining concrete 'Dragon's Teeth' defences on the outskirts of Lerwick which were designed to hinder tank movements.
Creative Commons © Scotland's Urban Past

Down's Syndrome Scotland enjoyed a community mapping workshop as part of a project to create a warm welcome for their international visitors at the World's Down's Syndrome Congress. © Julie Howden

HES staff joined Arbroath Academy's S1 and S2 history group to share their success in winning the 'Best contribution to a Heritage Project by Young People' award at the City Chambers, Glasgow. Creative Commons © Scotland's Urban Past

As part of plans to regenerate Dunoon's main shopping street, local residents donned their waterproofs for a built heritage walking tour in the rain, guided by Survey and Recording's architectural historians. With the help of SUP, locals learned how best to record the town's buildings and their own memories of them, adding information to the National Record.

Arbroath Academy's S1 and S2 after-school history group devised a historical 'geocache' trail around Arbroath Abbey for other young people to follow. Working with SUP, the History Crew researched and photographed the town (and themselves ...) and then hid their clues and geocache treasures around the Abbey grounds. We were delighted when they took the top prize for Best Contribution to a Heritage Project by Young People at the 2018 Scottish Heritage Angel Awards, sponsored by the Andrew Lloyd Webber Foundation.



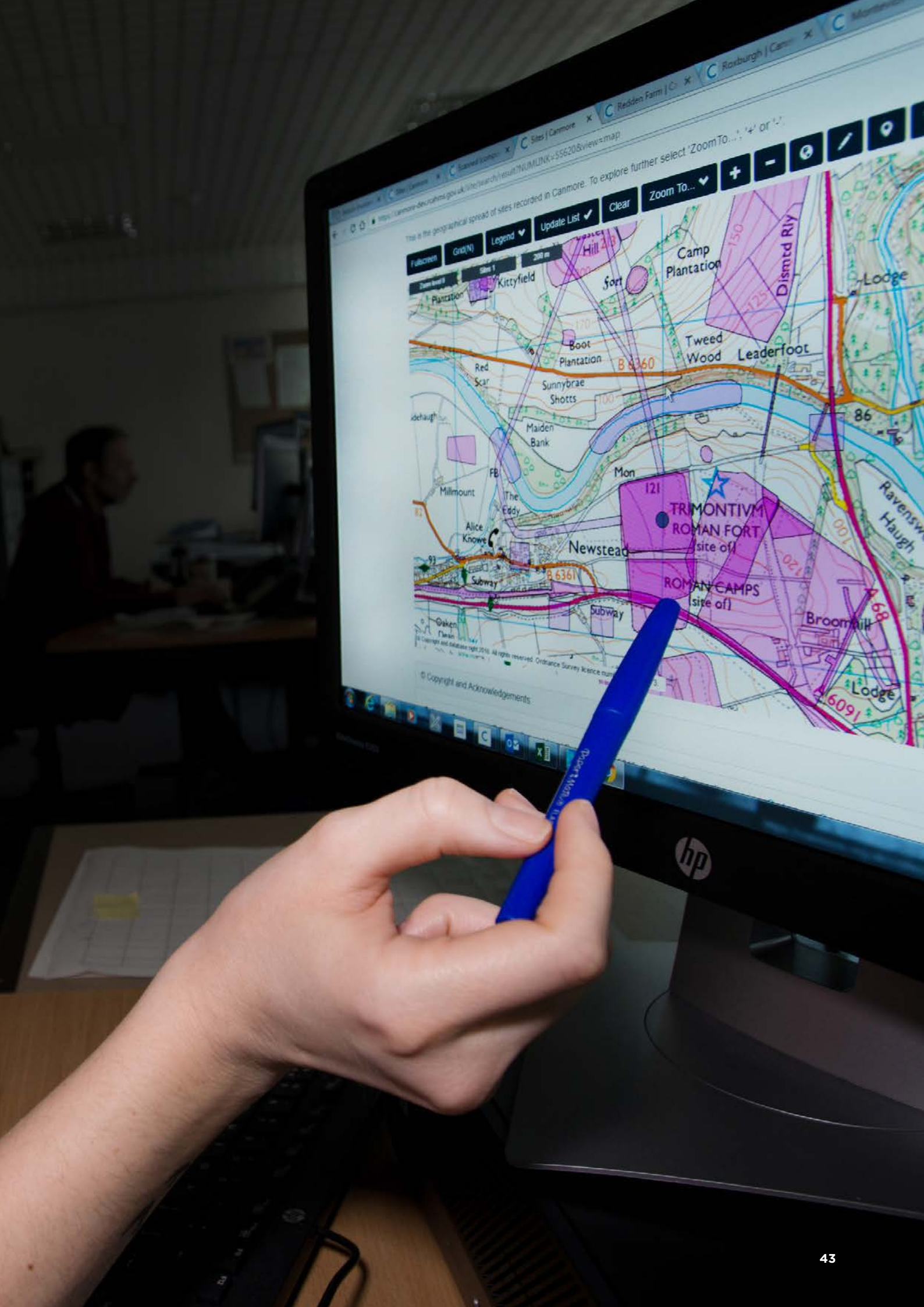
Dunoon locals joined us on a knowledge sharing walking tour of the town. Creative Commons © Scotland's Urban Past

6. IMPROVING AND SHARING OUR RECORDS

You can't help but notice from this publication that a lot of Survey and Recording work is done in partnership with others. That's because HES has an enabling role in making sure that everyone can enjoy, understand and join in with the care of the historic environment.

We have a key role in delivering **Scotland's Historic Environment Data (SHED) Strategy** by helping to bring the sector together to improve historic environment records. This is an important task because the information that we collectively hold underpins decisions about change and informs the interpretation of the sites, buildings and monuments around us. One of the ways in which we help local authorities and organisations such as the National Trust for Scotland is to give them direct access to the Oracle database that lies behind Canmore, the online gateway to our information. This means that they can add directly to the National Record of the Historic Environment.

Our data professionals apply their expertise to **improving the nuts and bolts** of our databases so that information is easily available to all. They are working hard to make sure that as many of our records as possible meet our new Minimum Record Standards criteria, which will make for better searching and discovery in the future.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Maiden Bank
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Millmount
The Eddy
Alice Knowe
Newstead
TRIMONTIVM ROMAN FORT (site of)
ROMAN CAMPS (site of)
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Ravenswood Haugh
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6.1 SCOTLAND'S HISTORIC ENVIRONMENT DATA

2018–19 marked the fifth year of the ten-year SHED programme, a collaborative undertaking between HES, local authorities, museums, archives, libraries and other bodies that hold information about the historic environment. As we approached the mid-point of the SHED strategy, this was a good moment to reflect on both how far we've come and where we want to go from here.

The early years of SHED focused mostly on the information held about sites in local authority Historic Environment Records (HERs) and HES's Canmore, the database of the National Record of the Historic Environment. Lots of work has been done to agree standards and terminologies, making it much easier to connect and compare information from different sources. Over the last two years the conversation on standards has been extended to include museums, archives and libraries. We've found that 'place' is a concept that can help us to join our information together, allowing us to create links between, say, a museum object and a site record in Canmore.

Sounds straight forward? We wish! A big snag is that we don't all refer to the same place with the same name: we have lists of place-names that don't correspond with each other, or sometimes there's actually no list at all. To make matters even trickier, the same place can be known by many different names. The Institute of Geography at the University of Edinburgh has joined us in trying to help crack this problem and together we have approached the UK Geospatial Commission asking them to support the creation of a single gazetteer of Scottish place-names, past and present.

In the meantime, we're continuing to investigate the best way to create links between our records and those of other organisations holding complementary data. We have added links to Canmore records that take our user to the records in the Glasgow Women's Library's Women of Scotland website. This fantastic resource records the places and monuments in our country that are named after women and provides information about the women themselves. Canmore is currently light on biographic information, so this is a good match for us.

A major feature of SHED is the PastMap website, which displays many layers of site information, including HERs, Canmore data and designations (information about buildings and archaeology that have protected status). PastMap had a big makeover in early 2018 that added background layers of historic Ordnance Survey (OS) mapping and made it mobile-responsive so it can now be used on the go. These significant improvements have more than doubled its user numbers.

While it can be really useful to see information represented on a map, for many historic sites, such as Edinburgh Castle, the amount of information is

Objects and locations share the concept of 'place': Boots employees with finds from a Scottish Urban Archaeology Trust excavation at Mill Street, Perth, 1980.

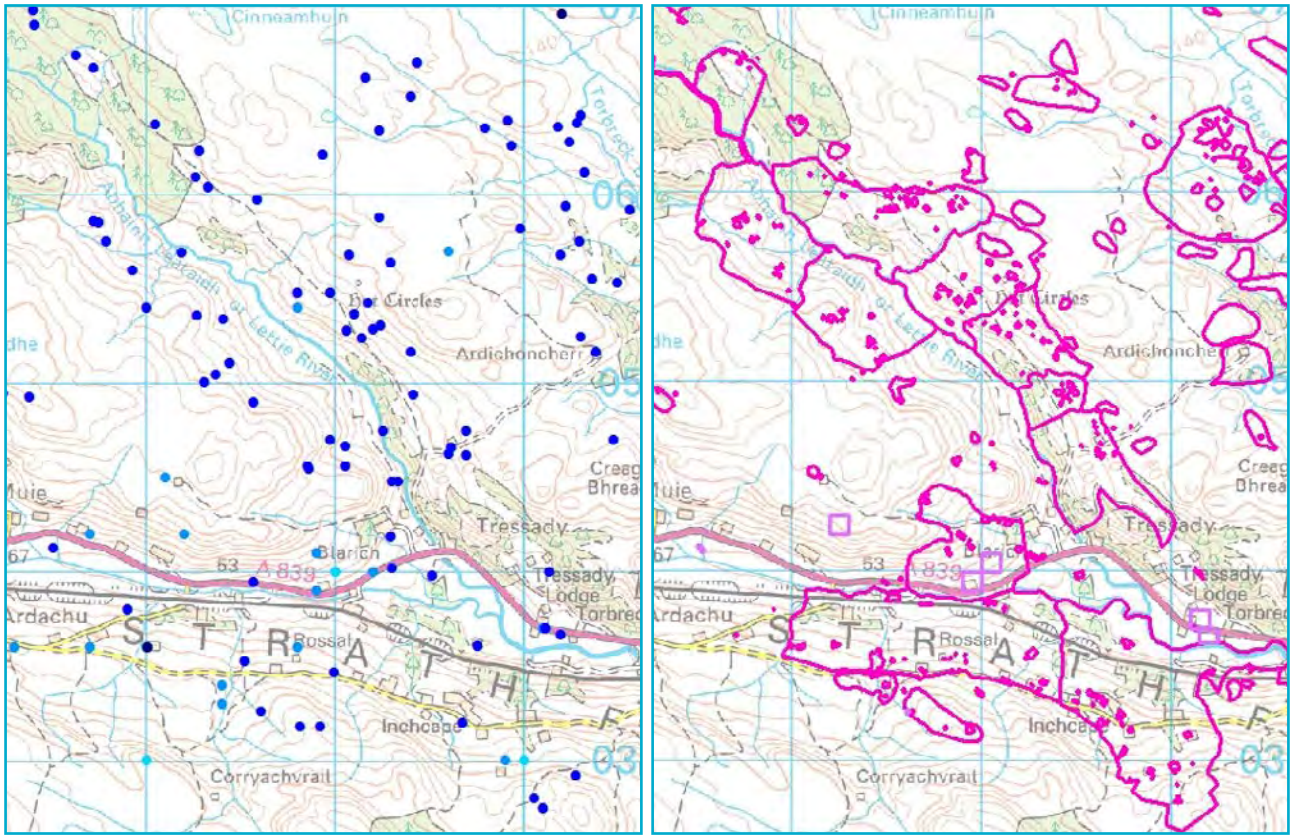
too large and complex to be successfully represented as mere dots. In order to understand these sites better, and for good decisions to be made about their management, it is important to know their full extent. With funding support from HES and Forestry Commission Scotland, SHED has been supporting work in a number of local authority HERs to create site polygons to replace dots. Shetland was completed in 2018, Stirling and Clackmannanshire in March 2019 while the Scottish Borders will be finished during 2019–20.

It will take a long time to get all of this useful polygonisation done and so we're trying an innovative approach with Registers of Scotland and the National Library of Scotland, which will hopefully speed things up. We're developing ways to automatically create polygons for buildings shown on Ordnance Survey maps from the mid 19th to early 20th centuries, and compare them in order to figure out if the building currently on the site was constructed after the 3rd edition map, between two of the maps, or is shown on the 1st edition map.

Although we don't expect to be 100% successful, this has the potential to create many thousands of useful polygons for our architectural site records, and to give us a strong indication about the age of buildings.

Artificial Intelligence and machine learning are being investigated as these technologies develop. We hope to harness these new techniques as we go forward with our continued aim to making our data ever more discoverable, better connected and more useful.

Dots vs polygons in Rogart, Highland. The dots represent a site by a single point, but the polygons show the full area covered by each site. This is essential in order to be able to fully understand and if necessary protect the archaeology of a site. What is depicted as empty moorland on the modern Ordnance Survey map reveals itself as a once densely populated and productive, highland landscape. The records in Canmore totally change our understanding of this landscape and these polygons help us visualise this.



6.2 DATABASE NUTS AND BOLTS

Canmore, the database of the National Record, exists to benefit all our users, whether they are people enjoying finding out more about Scotland in their spare time, those using it to inform their work, or learners. It is a world-leading resource that has been built up for more than a century. However, a lot has changed over that time, in terms of how records are created, and the quality of the 350,000 records relating to sites in our database is inevitably variable. We recognise that we need to bring them all up to a good standard, and that involves figuring out where they are weak and keeping tabs on the growing number that make the grade as we work towards achieving a consistent standard.

Through consultation, we have developed Minimum Record Standards (MRS). In a nutshell, for each site we should know where it is, when it dates from and what type of site it is. Additionally, we should offer some informative text, some linked archive (if there is any) or a link to further information.

We carried out a baseline test of the database at the start of 2018–19 and have been reassessing it every three months. This is giving us a picture of where we need to concentrate our efforts to improve the usefulness of our information. Over the year, the number of sites passing the test increased by 5,868, and the percentage increased from 35.5% to 36.8%. That might seem like a slow start but in the coming year we will start to use automated techniques to speed up our progress. The bigger picture is that our information will be increasingly easy to discover and use.

UPDATED DATABASE

What you won't have been aware of when you're online using Canmore is that behind the database was an aging data input system – 'Oracle Forms'. During the past year, this has been rewritten in a more up to date version, 'Apex', and the old system was turned off at the end of March 2019.

Why does this matter? Well, first and foremost, this big change behind the scenes secures our ability to continue updating Canmore so you can find out about Scotland's archaeology, buildings and industry. But there are a number of other benefits of the new system:

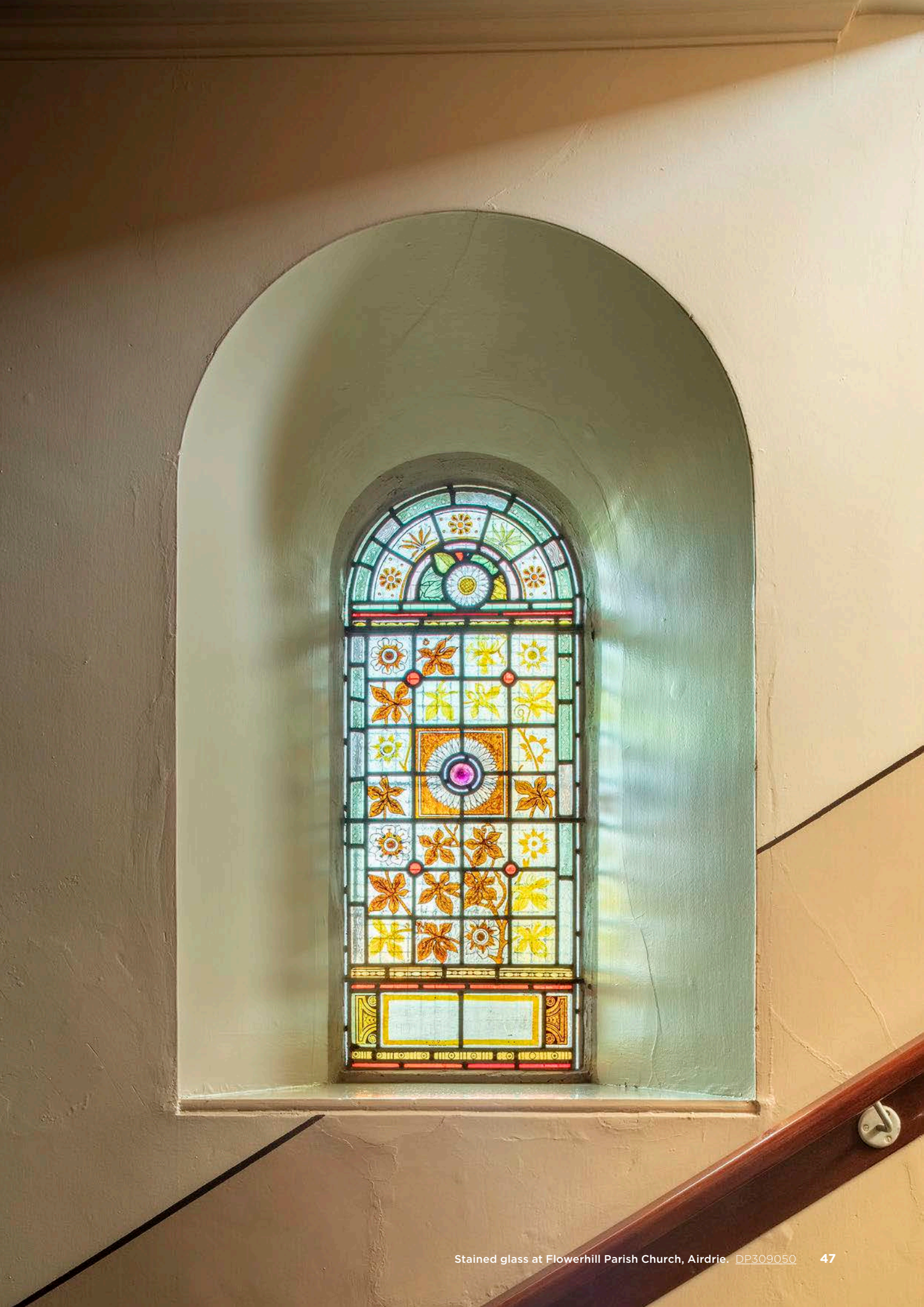
- We're now using browser technology that can be used anywhere where there's web access, so our staff can use it when they are out and about on fieldwork as well as in the office.

- Our colleagues in HES who have never used these systems before can now do so – they don't have to scribble down or email their findings and then send them to one of the Data Management team; they can easily add it themselves. That's a lot of time saved.

- Just like many other websites, we have introduced mandatory fields that absolutely have to be filled in, which ensures that our records contain the information people find the most useful. This helps ensure that we're telling people the key things that they want to know about a site.

- Improved searching and reporting functions mean that staff are able do their jobs faster and better.

The new system provides a stable platform with which we can continue to deliver, enhance and build Canmore's content for an increasingly wide audience. Keep an eye out for further improvements in the year ahead!



Stained glass at Flowerhill Parish Church, Airdrie. DP309050

7. PHOTOGRAPHY SHOWCASE: CAPTURING TODAY FOR TOMORROW

Our Survey and Recording photographers are out and about in all weathers recording everything from prehistoric stones to grafitti, black houses to country houses and everything inbetween. Sometimes we need to move quickly to record a building before it is demolished or altered; on other occasions photographers contribute to a planned survey recording programme of a particular site. The images they produce are of the highest quality, ensuring that the National Record of the Historic Environment is continually updated with the best possible visual information. Photographs are a vital part of how we document the historic environment and our photographers strive to capture not only the detail of the subjects they record but also the intangible mood of place. The following images, and those spread throughout this document, showcase examples of the photographers' skills.

Martello Tower, Hackness, Orkney. DP280293

CLOCKWISE FROM TOP LEFT

Lounge at 19 Belhaven Terrace West, Glasgow. DP309051

Roundel in the atrium of Napiershall Board School, Glasgow. DP311366

Malted grain bins in a former kiln area of Bunnahabhainn Distillery, Islay, Argyll and Bute. DP303333

Lochranza, Arran, North Ayrshire. DP278936

Invervar, Perth and Kinross. DP276226


Green
TRIXIE
TRIXIE
TASTIX
TASTIX
TASTIX
Webbox
Webbox
Webbox
RAT TRAP
little nipper
WhistleStop
Mini Treat Park Lever
ACID TART
ALOES
ALUM
BRUSHES
CAMPHORA
CANTHAR
CERA FLAV
MUSTARD
OPIUM
POT BICARB
P. SEIDLITZ
CREM TAR

Fittings from the 1890s at a former veterinary pharmacy, 81 High Street, Coldstream, Borders. DP299073

8. ENHANCING AND SHARING SKILLS

As an Independent Research Organisation, recognised by the UK Research Councils, HES has an important role in training the specialists of the future. One way we do this is through **Collaborative Doctoral Awards** where we have a good track record of working with universities on PhD projects that are producing the experts of tomorrow. We also make opportunities for students and others to gain experience with us and are currently running a non-graduate **Traineeship** which is demonstrating that there's more than one route into professions like archaeology than getting a degree. In addition, we play a strong role in improving the training infrastructure in Scotland and the UK and are part of various training initiatives that will be of wide benefit to individuals and to the sector.

8.1 RESEARCH PARTNERSHIPS

For the past few years Historic Environment Scotland has been recognised by the UK Research Councils as an Independent Research Organisation (IRO) in recognition of the high quality of the research produced by our staff. IRO status has allowed us to create opportunities for PhD researchers, including several within the Survey and Recording Group.

A milestone was achieved in 2018 as the first of our AHRC-funded Collaborative Doctoral Award (CDA) students, Will Wyeth, was awarded his PhD, on the subject Scotland's Early Stone Castles c.1050–1350. Will achieved this a few months after his intended finish date because he needed to pause on his write-up having landed a fantastic opportunity working with English Heritage as a Properties Historian specialising in castles and landscapes. He was well placed for success in getting such a sought-after job, given the wealth of practical experience that he gained working with his Survey and Recording supervisor and our team on surveys at sites such as Turnberry Castle, Castle of Old Wick and Tibbers Castle.

While Will has come to the end of his PhD journey with us, we still have two other doctoral candidates progressing well at different stages of their studies. 2018–19 has been the last of Linda Ross' three years with us in collaboration with the University of the Highlands and Islands. Linda has been studying the impact of Dounreay on the built environment of the far north of Scotland and had a year of intense writing and revisions in the lead up to submission of her final thesis in summer 2019.

Meanwhile, Kat Atkinson's second year studying the architecture of the Fife-based firm Wheeler & Sproson has taken a different path, as she became the first of our students to take advantage of the newly available CDA Student Development Fund. This has allowed Kat to extend her study period to incorporate an extra few months in which she has been gaining practical skills within HES. She has visited Orkney and Thurso with our Scotland's Urban Past team, developing her skills in helping the public to interpret their historic environment.

Castle of Old Wick, Caithness. DP232047

Our contribution to the CDA scheme didn't stop with our own PhD candidates in 2018–19. In June 2018, HES took its turn in hosting the annual field school for the CDA students. A group of eighteen students from the various host institutions of the scheme came together for three days in central Glasgow, meeting staff from across our team on a tour of the city, taking in locations such as the Britannia Music Hall, Govan Old Parish Church, Glasgow Women's Library and Kelvingrove Museum. The students were introduced to the range of work that our teams do, trying out some of our work for themselves – from drawing medieval carved stones to identifying graffiti in the city's back lanes. Throughout the field school, students discovered how the skills they develop during a PhD are transferable into work roles within the heritage sector.

With several other ideas for collaborative PhD topics, and other links with doctoral students around the UK and beyond, high-quality academic research remains high on the Survey and Recording agenda.

RIGHT
Non-traditional timber housing built for the UK Atomic Energy Authority at Thorfinn Place, Thurso, 1954. DP258509

Redevelopment at Burntisland, Fife, by Wheeler & Sproson Architects, c.1965. © RCAHMS SC766676

8.2 AN ARCHAEOLOGIST IN TRAINING

In October 2018 Katrina Gilmour started an eighteenth-month vocational traineeship in the Survey and Recording Group. During her time with us Kat is being taught how to analyse, interpret and record a broad range of archaeological sites and monuments across Scotland, and how to share that information with others. Her practical work will count towards a National Vocational Qualification in Archaeological Practice, through the Chartered Institute for Archaeologists. This initiative is demonstrating an alternative and viable route for non-graduates to gain employment within the archaeology sector, where at present 93% of those employed have university degrees. Kat explains:

'I'm being taught various survey techniques, ranging from carved stone recording and plane table survey to Global Positioning Survey (GPS) and laser scanning. My first taste of fieldwork came at Garnethill Park in Glasgow, where I and staff from Glasgow School of Art were introduced to the principles of plane table survey by producing a plan of the park. This was followed by a week in Aberdeenshire undertaking surveys of prehistoric burial-cairns and a henge, as well as a modern stone circle. Back in the office, I set to work seeing these surveys through from interpretation and recording in the field to processing and publishing in the office. This involved scanning the pencil survey drawings and producing finished illustrations of the plans using professional software. I then learned how to catalogue and add these to the National Record for the Historic Environment, thus making them accessible to the public through Canmore.

'As well as preparing individual site surveys for publication, I have also been learning how to create maps for publication that are designed to show site locations and/or distributions of monuments. This is an important skill that my colleagues were really keen to pass on, so I was tasked with creating a map for a pdf report on the survey of a 19th century farmstead on Orkney.

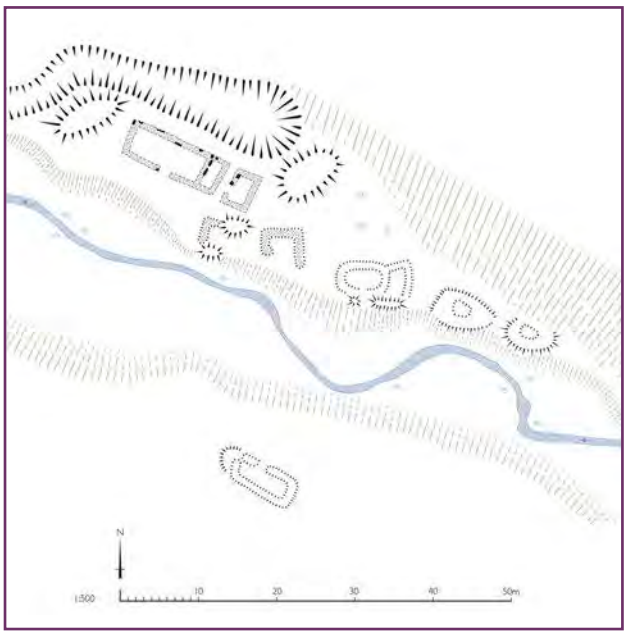
'I've also been busy learning how to accurately map sites to the Ordnance Survey National Grid using GPS, and I gained much practice in this through working on the Aerial Defences of the Clyde project. I recorded both the concrete remains of heavy anti-aircraft batteries and the more ephemeral earthwork remains of light anti-aircraft batteries, later using these skills to assist in the recording the North Sutor coastal battery in Easter Ross.

'In March 2019, I was part of a team working around Kilmartin Glen in Argyll, checking possible previously unrecorded sites that had been identified by colleagues interpreting airborne laser scan data. Each day the team planned a route that would include some of these new sites but also other sites nearby for which the existing NRHE record needed to be revised. This gave me the opportunity to work with the data on mapping our

Recording the coastal battery at North Sutor, Cromarty Firth.

field computers and experience a range of archaeological sites which I was not familiar with. This field experience complemented the work of mapping cropmarks from aerial photos which I've begun to do with colleagues from our Rapid Archaeological Mapping Team.

'In addition to our core survey work, I'm being given a solid introduction to other important aspects of our operations, including health and safety, creating risk assessments and data protection. I'm looking forward to playing a role in HES's new Youth Forum in the next phase of my training, as well as getting out and about to pass on the skills I've learnt to others, especially communities and children who are interested in their heritage. I've also got a chance to share my insights of being an HES trainee at the UK Archaeology Training Forum in autumn 2019.'



Kat's site plan of Lecht Mine, Moray.

Surveying Allt Na Broighleig farmstead, Lecht, Moray.

9. LOOKING TO THE FUTURE

The HES Survey and Recording Group plays a key role in the delivery of Scotland's Historic Environment Strategy, *Our Place in Time*. Our work is essential to the delivery of HES's ambitious priorities and outcomes as outlined in its new 2019–22 Corporate Plan, Heritage for All. We'll continue to promote knowledge about the historic environment by improving our collective understanding through the research and investigation that we do. And we'll carry on sharing our findings with and promoting the value of heritage to communities through our innovative and creative engagement activities.

Flagship programmes, such as our aerial survey and the Buildings at Risk Register, will continue but we will also embark on new ones. As we move further into the 21st century, the final quarter of the 20th century is ever further in the past and our perspective on this has led to a survey programme on post-1975 architecture; we're also looking at intangible cultural heritage and the need to record more of contemporary Scotland for future generations of researchers. The archaeological fieldwork that we're planning is taking us all around the country, from Kilmartin Glen to the Isle of Arran, and from South Shetland to Ancrum in the Scottish Borders. We're looking forward to learning new and creative ways to exploit our data through working with the Scottish Graduate School for Arts and Humanities and Product Forge on a special heritage 'hackathon'-style event. And our five-year Scotland's Urban Past community engagement programme will go out with a bang with its grand finale exhibition and publication.

We're always happy to explore ideas for partnerships and collaborations, or to receive feedback about our work and our resources. If you would like to get in touch, please phone our Public Services team on 0131 662 1456 or email archives@hes.scot; they will ensure that your enquiry goes to the right person.

"It is great to see HES making such exciting use of the increasing amount of remote sensing data becoming available, which will help to play a part in keeping Scotland at the forefront in this field."

Dr Shona Nicol, Head of the Geographical Information Science & Analysis Team, Scottish Government

"As an artist working in the landscape, engaging with HES at Garnethill in Glasgow has allowed me further and significant insights into:
(1) alternative ways of reading the historical and social depth of our land- and urban-scapes, and the importance of even the small and subtle markers found that reveal the qualities both of place and of belonging;
(2) the importance of studying and recording such markers for posterity."

Jim Harold, Artist

"The Survey and Recording traineeship has opened up a world of experiences and opportunities to develop skills that I'll be able to employ within the wider heritage sector."

Kat Gilmour, HES Survey and Recording Trainee

"The Traprain Law plan that Survey and Recording created is super! It is so useful to have all the interventions mapped, this is something we tried to do in the past but didn't have very accurate mapping of the various bits of fieldwork, so it's extremely valuable to have this."

Stephanie Leith, East Lothian Council

"The 90-odd stones at St Andrews Cathedral aren't yet well known or loved. My research and the draughtsmanship within Survey and Recording has jointly allowed us to imagine the whole collection with far more character and visual impact. The analysis of these tantalising fragments will provide much greater understanding of what was going on at St Andrews during the little-known period between about 850 and 1100."

Professor Jane Geddes, University of Aberdeen

"[Celebrating Speyside] has been such an amazing project and it has really enhanced and enriched my pupils' learning experiences this year. It has been a diverse project allowing us to encompass many aspects of the Curriculum, from literacy, numeracy, social studies to science and health and wellbeing and expressive arts. Fantastic."

Primary School Teacher, Speyside

"Developing new skills 'on the job' with the Survey and Recording team has proved invaluable to developing my career as an early career researcher. My collaborative PhD enabled me to secure a dream job where I specialise in castles and castle landscapes, so I have much to be thankful for!"

Will Wyeth, Properties Historian, English Heritage

"[We enjoyed] learning about photography from professionals who actually take photos as part of their job… and understanding how to measure things without a ruler."

Scotland's Urban Past participants from the West of Scotland Regional Equality Council

"The Scottish Maritime Museum was excited to host 'Industry + Aesthetics'. As a museum of Scotland's shipbuilding industry, we have worked hard to share the historical value of our collection, and it was wonderful to be part of a project that shows not only how integral industry is to Scotland's heritage, but to challenge expectations and show how that heritage can be a source of artistic creativity."

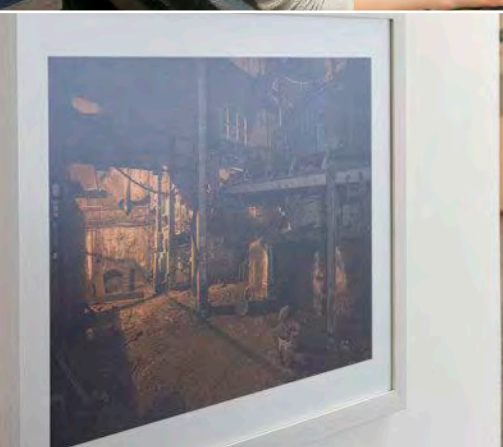
Matthew Bellhouse Moran, Assistant Curator at Scottish Maritime Museum











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