ISAP NEWS

The newsletter of the International Society for Archaeological Prospection

Issue 53

April 2018

ICAP 2017 Write Up

Survey at Pea Ridge National Military Park

Prospection And Landscape Management

Editorial

Dear ISAP members. Welcome to issue 53 of the newsletter. We have an interesting survey from an American Civil War battlfield this issue, and some insights into how geophysical survey can inform the management of landscapes with significant archaeological remains, using a case study in the UK.

We also have the second of our reviews of the ICAP 2017 meeting in Bradford last autumn. We are considering making these conference write-ups a regular feature in ISAP News. So, if you are at a conference, workshop or fieldschool that covers matters of interest to ISAP, why not submit a short write up to the newsletter?

We've also been surveying you about ISAP and social media: expect an update from the management committee about the survey results and next steps fairly soon!

With the weather finally taking a turn for the better (here in the UK at least), take care in the field, remember sunscreen is also PPE!

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The Cover Photograph shows a trusty gradiometer overlooking upland landscapes in Asturias. The editor took it on fieldwork last autumn with the Upland Archaeology in North-West Iberia Project. You can follow the project on twitter @UplandArchaeology, or click this text to go to the facebook page.

A Fluxgate Gradiometer Survey at an American Civil War Battlefield, Pea Ridge National Military Park

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As a trial run of its SENSYS MAGNETO MX V3, the National Park Service, Midwest Archeological Center (MWAC) performed a fluxgate gradiometer survey at Foster's farm, a component of Pea Ridge National Military Park (PERI) in northwest Arkansas (USA), in September 2017 (Figure 1). The park preserves a vast landscape that encompasses multiple locations associated with the Battle of Pea Ridge, a two-day engagement between Union and Confederate troops in March 1862. Although short in duration, the Union victory proved influential in the struggle over the border state of Missouri and turned the tide of the American Civil War west of the Mississippi River (Shea and Hess 1992).

The engagement at Foster's farm took place on March 7, the first day of the battle, near the western margin of the present-day park. The encounter occurred when a Union force led by Colonel Peter J. Osterhaus was sent to investigate reported enemy troop movement north of and to the rear of the Union line. Osterhaus divided his force, deploying infantry and artillery in Oberson's field while continuing with cavalry and artillery through a wooded area to the southwest corner of Foster's farm (Shea and Hess 1992; Figure 2). When the men emerged from the woods on the southern margin of Foster's farm, they observed Confederate troops commanded by Brigadier General Benjamin McCulloch marching eastward along Ford Road on the opposite side of the field. Three Union artillery pieces were deployed and fired toward the northeast, which surprised and provoked a Confederate response. The Confederate cavalry quickly overwhelmed the smaller Union force, which retreated to Oberson's field. From that location, Union artillery apparently fired over the trees toward Confederate forces at Foster's farm for several hours, occasionally redirecting toward infantry that emerged from the woods to their north and east. McCulloch would be killed during the engagement, a decisive factor in the Confederate defeat.

Figure 1: *Fluxgate gradiometer survey performed at Pea Ridge National Military Park with an 8-channel SENSYS MAGNETO MX V3.*

PERI has been the subject of several archeological investigations, including extensive metal detecting inventories of locations associated with the battle (Carlson-Drexler *et al.* 2008). In recent years, the Arkansas Archeological Survey and MWAC have incorporated magnetic gradiometry into these wide-area investigations with a goal of accurately mapping the locations of iron artifacts. MWAC surveyed part of Foster's farm, an area that was previously sampled but not systematically investigated with metal detectors (Carlson-Drexler *et al.* 2008), to test its newly acquired SENSYS system.

The MAGNETO MX V3 is a modular array with an integrated real-time kinematic dGPS that may be assembled in several pushed or towed configurations with different numbers of fluxgate gradiometers and distances between the sensors. For this survey, we used the towed cart in an 8-channel configuration with each gradiometer separated by 50 cm (Figure 1). In approximately three hours, we surveyed nearly 5.8 ha, an area that covers two-thirds of the fields at Foster's farm (Figures 2 and 3). The results show hundreds of pronounced anomalies with strongly polarized expressions that likely represent iron or steel debris. Numerous iron items were recovered during the previous metal detecting surveys near Foster's farm, including artillery-related objects like solid shot, exploded shell fragments, case shot, and canister balls (Carlson-Drexler *et al.* 2008). For this reason, we think the anomalies mostly represent battle-related iron artifacts like artillery projectile remnants.

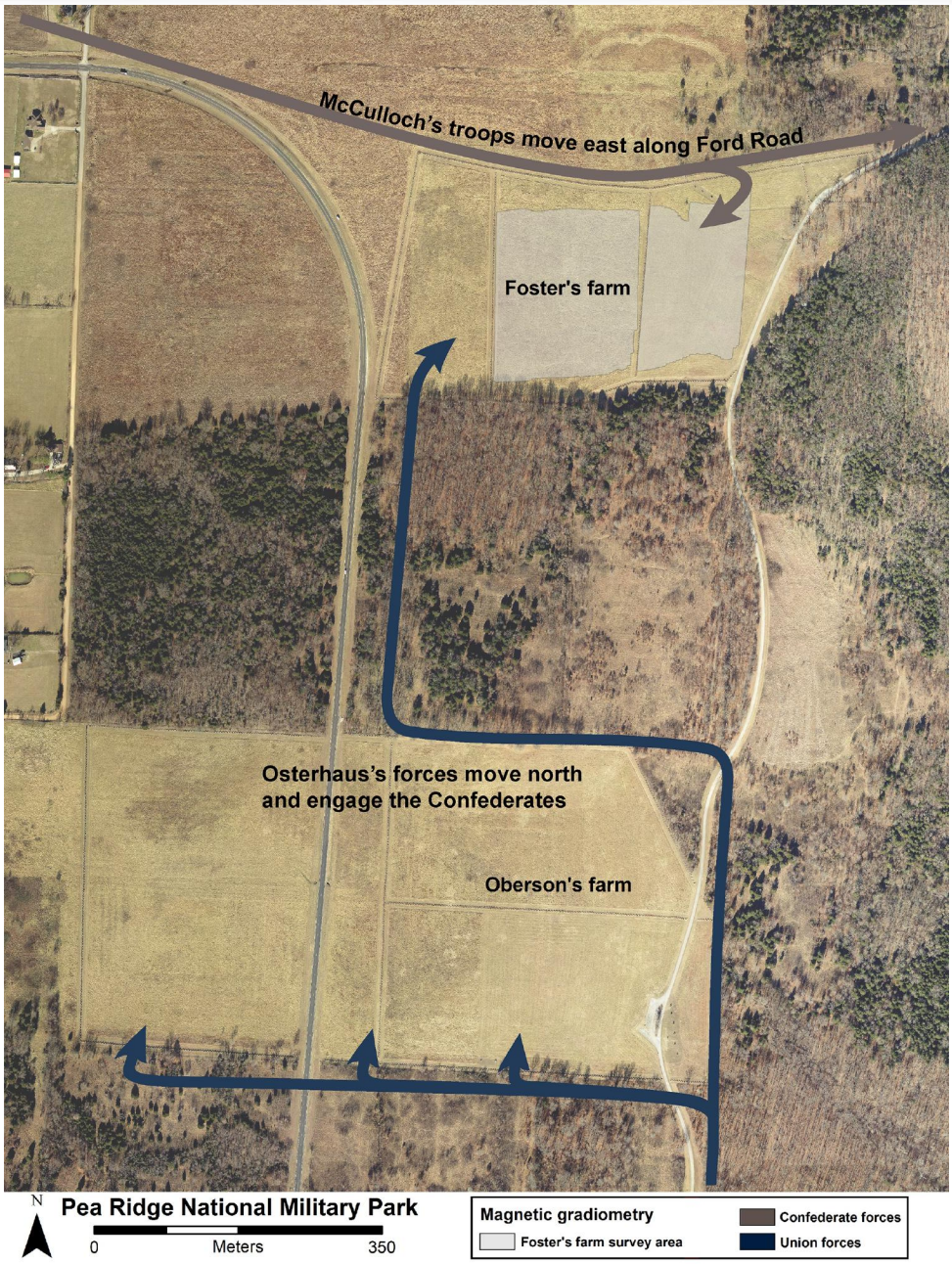

Figure 2: Map illustrating the survey area in the context of the engagement between Confederate and Union forces at Pea Ridge on March 7, 1862.

The magnetic anomalies are clustered in two general areas, with a smaller roughly circular concentration near the northwest corner and a larger group across the middle of the survey. The main cluster extends about 175 m to the northeast from the margin of Foster's field adjacent to the dense wooded area. While further testing is necessary to confirm this interpretation, the cluster's narrow width indicates it may be the result of fire from one Union artillery battery located along the southern edge of Oberson's field, which reportedly fired blindly over the wooded area into Confederate forces at Foster's farm (Shea and Hess 1992; Figures 2 and 3). Although metal detectors are able to locate a wider range of ferrous and non-ferrous metals, magnetic gradiometry is advantageous for multiple reasons, including survey rate and measurement depth. As we illustrate, the technique is capable of providing new insight about areas of engagement and is therefore complementary to metal detecting in battlefield investigations.

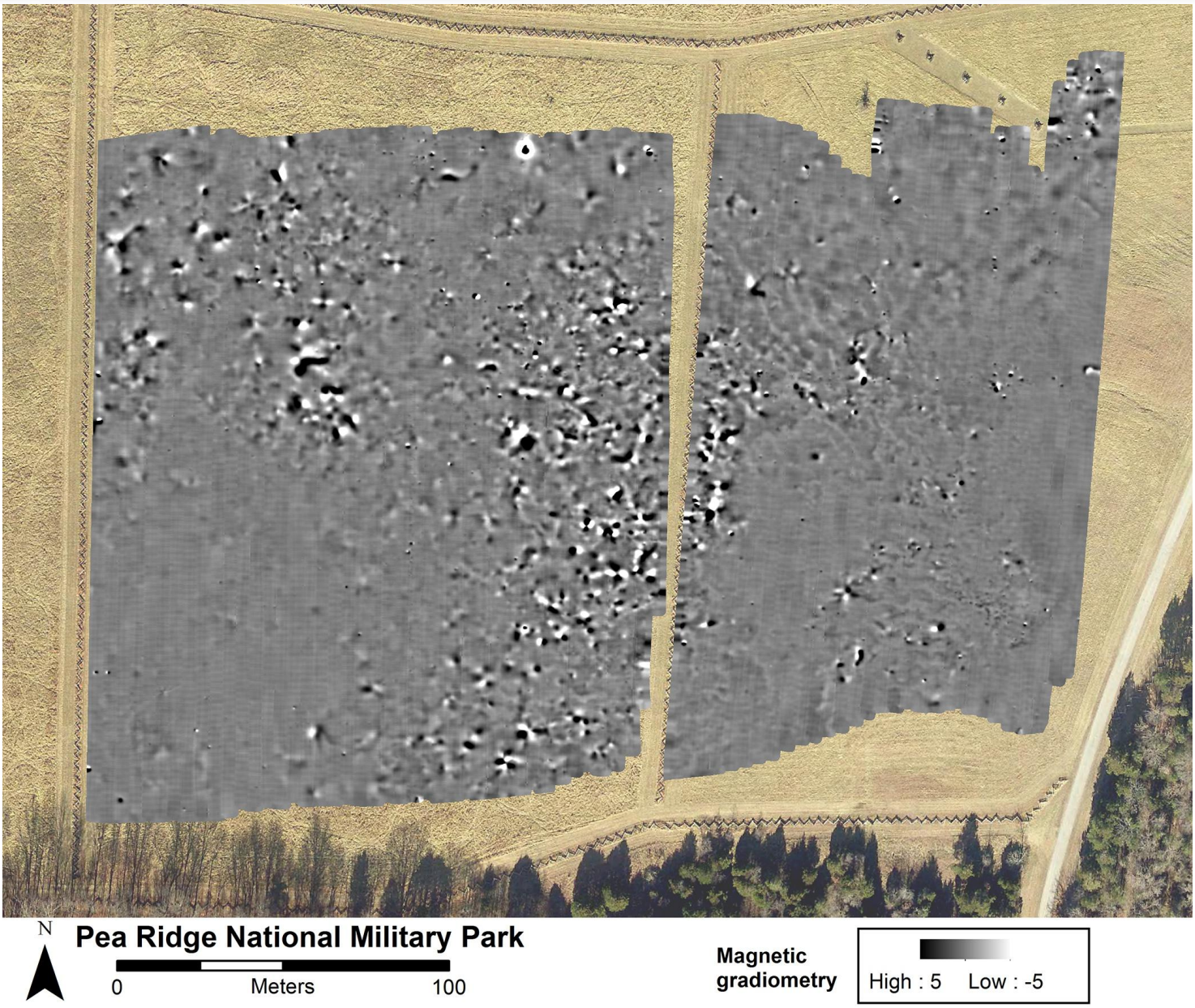

Figure 3: *Fluxgate gradiometer survey results at Foster's farm, which show concentrations of anomalies associated with artillery projectile fragments and other iron artifacts.*

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Scott, and Harold Roeker (2008) *"The Battle Raged…With Terrible Fury:" Battlefield Archeology of Pea Ridge National Military Park.* Midwest Archeological Center, Technical Report 112. United States Department of the Interior, National Piark Service, Midwest Archeological Center, Lincoln, Nebraska.

Shea, William L., and Earl J. Hess (1992) *Pea Ridge: Civil War Campaign in the West*. University of North Carolina Press, Chapel Hill.

Geophysical survey for informing conservation and management plans: a multi-phase site at Ferry Meadows Country Park, Peterborough

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Introduction

Ferry Meadows Country Park sits within a meander of the River Nene, just west of Peterborough in Cambridgeshire. Almost all of the central part of the park, about 44ha, is scheduled ('Lynch Farm complex'; 1006822), as cropmarks indicated extensive late prehistoric and Roman occupation and burial evidence, including Bronze Age barrows, Iron Age ditch systems and pit alignments, Roman buildings and enclosures. In consultation with Dr Stephen Upex, the Nene Park Trust commissioned Archaeological Services Durham University to conduct a high resolution geomagnetic survey across all available parts of the scheduled area in 2016, the principal aim being to assess the nature and extent of sub-surface features of potential archaeological significance. The survey results, together with cropmark and excavation evidence, are being used to inform a park management plan and, potentially, a revision of the scheduled area to exclude areas where gravel extraction took place in the 1970s.

Some archaeological excavations conducted in the 1970s were published at the time, others are being published now (Upex, in press). The following context for the geophysical survey is based on draft text from Upex's forthcoming report. The expansion of Peterborough in the 1960s and 1970s required vast amounts of aggregate and the meanders of the Nene were an ideal place from which to extract sand and gravel. It was recognised at the time that gravel extraction and the creation of lakes would provide an ideal location for later recreational facilities. The proposal was therefore to extract gravel from areas which were thought to contain no, or only limited, archaeological remains (based on cropmark evidence) and then to create what was later called 'Ferry Meadows' at the centre of a larger designation of recreational land now called Nene Park, managed by the Nene Park Trust. Peripheral areas within the meander were thought to lack archaeological significance. However, once gravel extraction started, the remains of further Roman buildings were found (ibid.) as well as a Roman farmstead and cemetery.

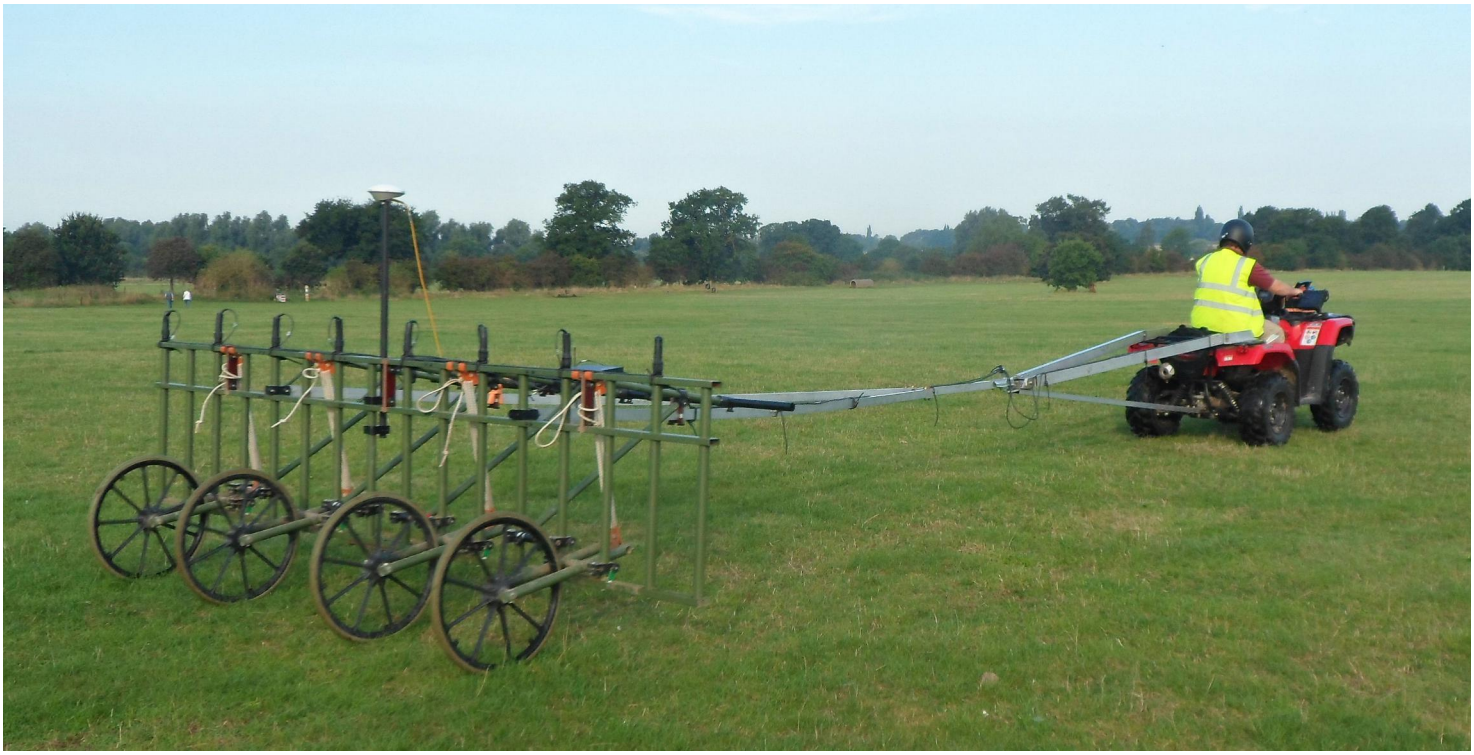

Figure 1: *Geomagnetic data collection with multi-sensor array*

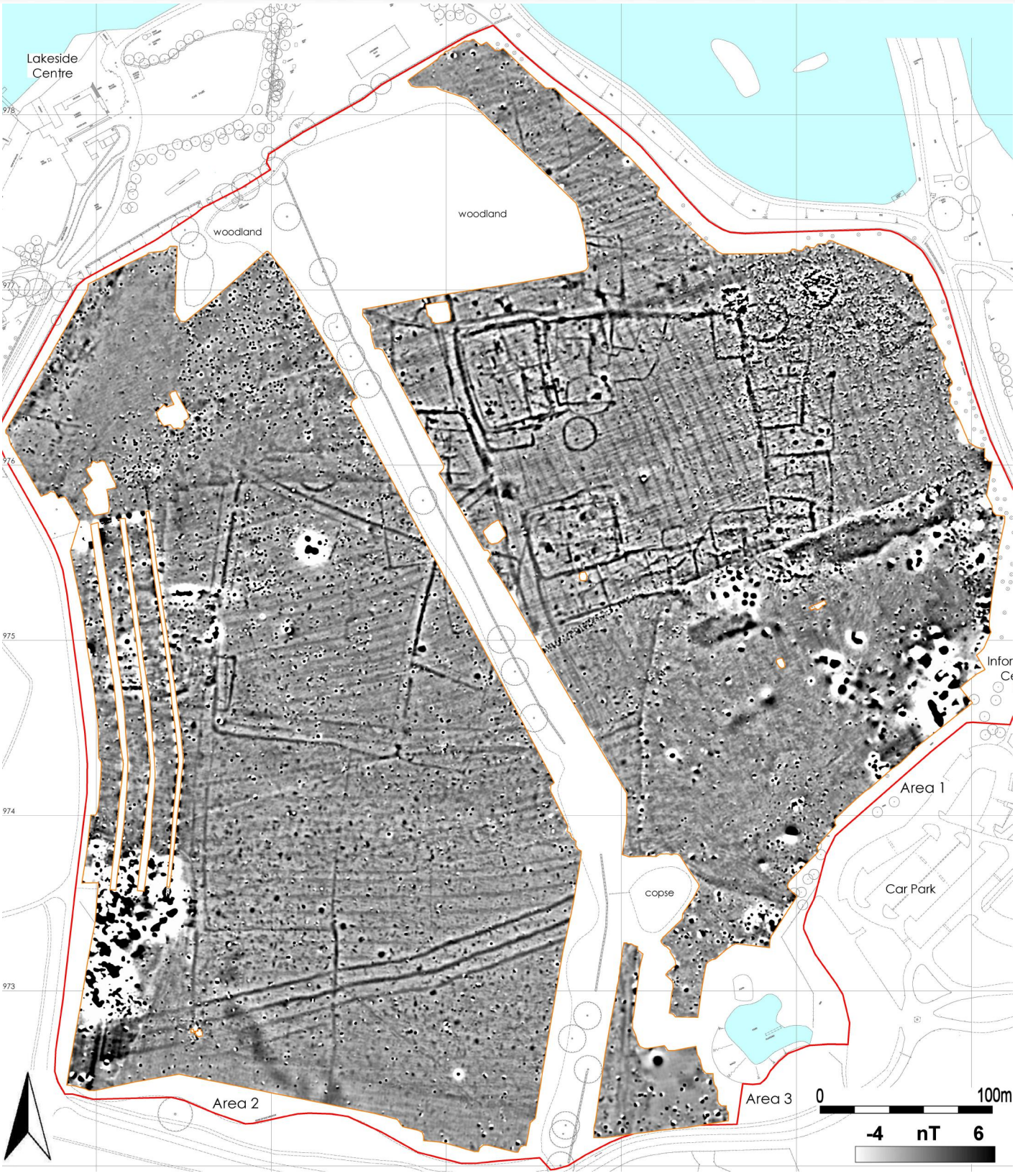

Figure 2: *Geophysical survey*

Data collection and processing

Measurements of vertical fluxgate gradiometer data were undertaken using a Sensys Magneto MX V3 multi-sensor magnetometer survey system towed by a quad-bike (Figure 1). Eight fluxgate gradiometer sensors were mounted at 0.5 m spacing, logging data at less than 0.08 m intervals along traverses, providing high density data collection. Data point locations were recorded using an integrated global navigation satellite system with RTK correction. Sensys MonMX, DLMGPS and MagnetoARCH software were used to collect and display gradient and positional data. TerraSurveyor software was used to apply a low pass filter and to interpolate the data.

Results

Three areas of sand and gravel extraction have been detected in the surveys (Figures 2 and 3). These are

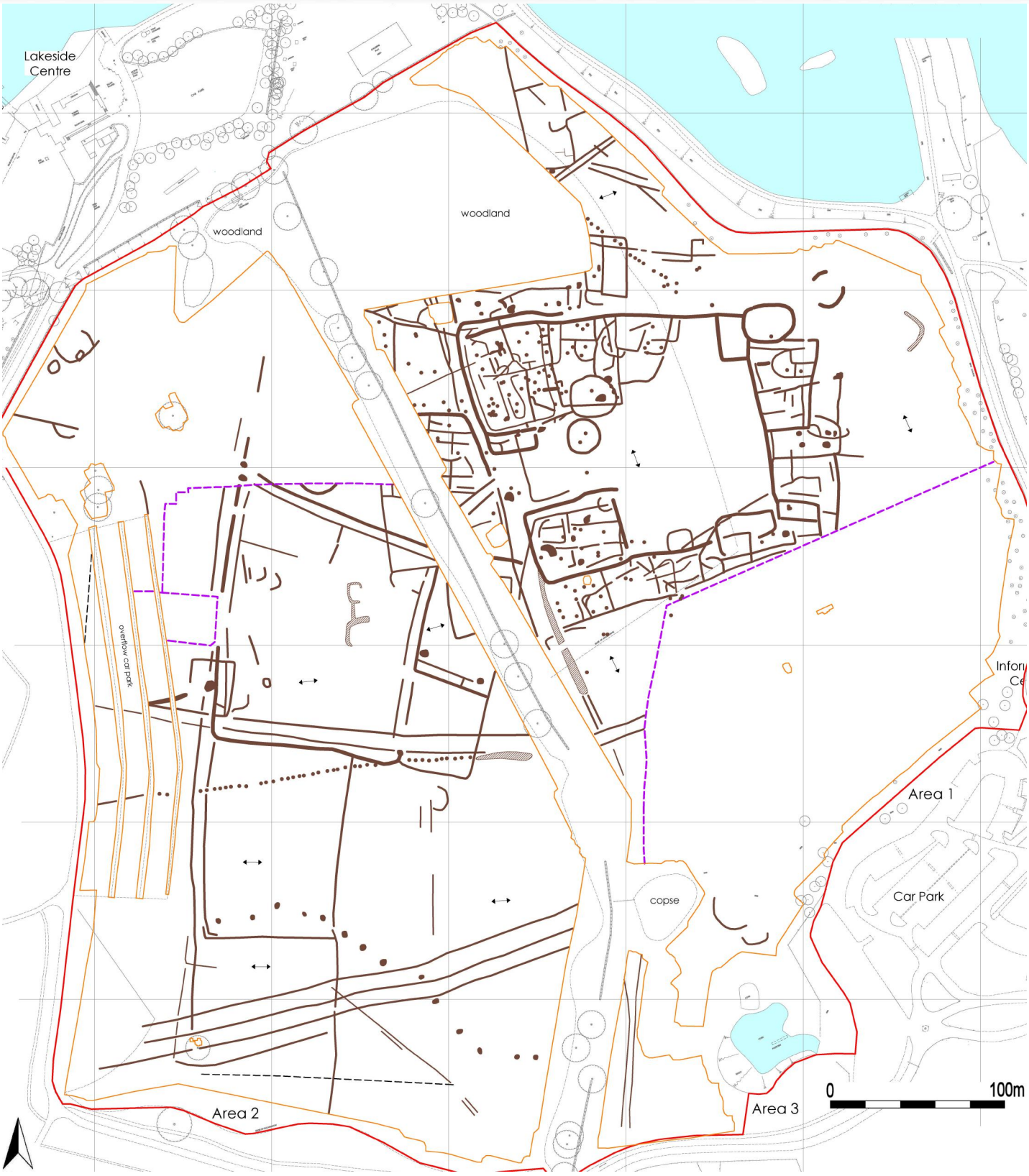

Figure 3: *Archaeological interpretation*

evident, in part, as areas where traces of former ridge and furrow cultivation are absent. All three areas are well-defined with clear anomalies along their edges. One extraction area covers much of the south-eastern part of the survey, and is evident on an aerial photograph from the 1970s. Another extraction area is evident in the north-western part of the survey. Both of these extraction events cut through and removed archaeological remains, though some of those in the east were excavated as 'Lynch Farm Site 3' prior to gravel extraction. A third, smaller, post-medieval extraction pit was detected in the west of the area.

A complex of ditched enclosures and other features was detected across much of the survey area. The majority of the ditches define enclosures and trackways, however, some ditches are almost certainly associated with earlier, Bronze Age, round barrows. Several such barrows have previously been

investigated along the floodplain of the River Nene. The clearest example detected here is within the broadly square arrangement of enclosures in the north-east. Five further probable barrows were also detected, all within a broad east-west band across the northern part of the site. A probable barrow in the north-west quarter of the survey was largely removed by gravel extraction works.

The majority of the ditched enclosures, former field systems, trackways, boundaries and pits are likely to be late Bronze Age, Iron Age and Roman in date. Two alignments of relatively small and closely-spaced pits were detected in the north and in the west. A third pit alignment, comprising larger pits spaced 10-20 m apart, was detected in the south-west of the survey. Pit alignments are typically prehistoric, of uncertain function but thought to mark former boundaries, often ritual. Substantial parallel ditches were detected across the southern part of the western area. These ditches appear to have formed a boundary between the land within the meander of the Nene and the land to the south. The ditches are evident on aerial photographs up to the late 1960s, shown extending eastwards, however, these parts were removed during gravel extraction works in the early 1970s. Trial excavation of these ditches in 1973 did not provide a construction date, though Iron Age and early Roman pottery was found in the upper fills.

In the north-east of the site, many of the enclosures are arranged around four sides of an apparently open space or compound (except for the barrow, above), providing a roughly square complex. When the south-eastern corner of this complex was excavated in 1972 prior to gravel extraction (Lynch Farm Site 3), the pits and ditches provided evidence for 3rd and 4th-century Roman occupation (Upex, in press).

The surveys were funded by the Heritage Lottery Fund, as part of the Development Phase of the Nenescape Landscape Partnership.

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Upex, SG, (in press) Iron Age and Roman settlement: Rescue excavations at Lynch Farm 2, Orton Longueville, Peterborough. East Anglian Archaeology Monograph Volume: 163

National Park Service's 2018 Archaeological Prospection Workshop

The National Park Service's 2018 workshop on archaeological prospection techniques entitled Current Archeological Prospection Advances for Non-destructive Investigations of the Marksville Prehistoric Indian Site (16AV1), Louisiana, will be held May 21--25, 2018, at the Marksville State Historic Site in Avoyelies Parish, Louisiana.

Lodging will be at the Paragon Casino Resort in Marksville, Louisiana. The lectures will be at a meeting room in the Paragon Casino Resort. The field exercises will take place at the Marksville Prehistoric Indian Site at the Marksville Sate Historic Site.

The site is the type site for the Marksville Culture, a local variant of the Hopewell Tradition. The site contains numerous earthworks built by the indigenous prehistoric people of the southeastern North America. Co-sponsors for the workshop include the National Park Service's Midwest Archeological Center and the National Center for Preservation Technology and Training, as well as the Marksville State Historic Site and the Office of Cultural Development, Division of Archaeology of the Louisiana State Historic Preservation Office This will be the twenty-eighth year of the workshop dedicated to the use of geophysical, aerial photography, and other remote sensing methods as they apply to the identification, evaluation, conservation, and protection of archaeological resources across this Nation. The workshop will present lectures on the theory of operation, methodology, processing, and interpretation with on-hands use of the equipment in the field. There is a registration charge of $475.00.

Application forms are available on the Midwest Archeological Center's web page. Payment wil be made by credit card through the Friends of NCPTT .

For further information, please contact Steven L. DeVore, Archeologist, National Park Service, Midwest Archeological Center, Federal Building, Room 474, 100 Centennial Mall North, Lincoln, Nebraska 68508-3873: tel: (402) 437-5392, ext. 141; fax: (402) 437-5098; email: steve_de_vore@nps.gov

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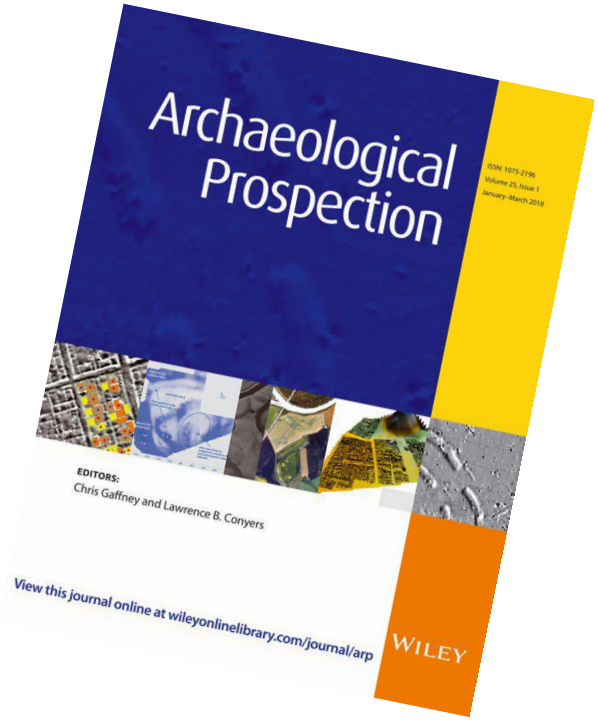

Data processing chain for high spatial resolution magnetic survey: Application on the Neolithic site of le Pontet (Charente-maritime, France)

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Archaeological prospection of a specialized cooking-pit site at Lunde in Vestfold, Norway

Lars Gustavsen, Rebecca J.S. Cannell, Erich Nau, Christer Tonning, Immo Trinks, Monica Kristiansen, Manuel Gabler, Knut Paasche, Terje Gansum, Alois Hinterleitner, Valeria Poscetti, Wolfgang Neubauer

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Terrestrial laser scanning and photogrammetry techniques for documenting fossil-bearing palaeokarst with an example from the Drimolen Palaeocave System, South Africa

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Hugh Thomas

Mapping the Inhospitable Landscapes of the Orkney Islands using RPAS

Kasper Hanus

ICAP 2017 Report: A first time atendee recounts the conference

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In September of this year, I travelled from Castlebar, Co. Mayo, to the University of Bradford to attend my first International Conference on Archaeological Prospection. Having worked for a couple of years as a geophysical surveyor in Ireland, it offered a fantastic opportunity to meet people whose names I had often heard and see what continental European and more far-flung counterparts were up to.

The conference presented a wide array of papers, showcasing many interesting projects and research being undertaken from around the world. The large landscape surveys being conducted by operators across Europe and into the Middle East were astounding, while novel applications of techniques (such as the shallow water surveys) were very stimulating, showing what is now possible. The enthusiasm displayed by some presenters (like gathering data at the weekends – something no commercial operator would relish) was quite motivational. It certainly put the idea of spending some time on more personal projects to the fore. Of particular interest were the handful of papers that contained a public-engagement aspect. With an increasing number of community groups that desire interactive experiences, these presentations gave a number of insights into how to engage and develop good practices. With no formal training in the science behind geophysical methods, I was thankful that only a few papers delved into the equations, which were intriguing and mind-boggling at the same time!

An unusual view of Foutains Abbey, photo by the editor.

Your trusty editor, engaging in extreme archaeological photography on the Fountains Abbey field trip. Photo courtesy of Roger Walker.

The CIfA training at the end of the conference provided a good opportunity to discuss the everyday issues with equipment that pop up and find out how other operators had dealt with them. It would be nice to see these CPA courses integrated with programmes from other countries, which would make it more valuable to international attendees. On top of this, the chance to debate about how to develop geophysical and archaeological practices in current economic climates was very welcome, as this is not something discussed regularly and inclusively often enough (or certainly in Irish circles at least).

The social events in the evenings were very enjoyable. The offers of tasty food and drink, accompanied by good music, created a great atmosphere to wind down after a day of presentations. Unfortunately, I missed out on the Monday evening gathering and the Saturday fieldtrip. However, after such an engaging first-time round, I will definitely make the effort to enjoy the full scope of the conference in future.

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