Institution: University of Oxford

Unit of Assessment: 15 - Archaeology

Title of case study: Improving Understanding and Protection of Endangered Archaeology in the Middle East and Northern Africa

Period when the underpinning research was undertaken: 2015 – 31 Dec 2020

Details of staff conducting the underpinning research from the submitting unit:

Name(s):	Role(s) (e.g. job title):	Period(s) employed by submitting HEI:
Professor Andrew Wilson	PI	2000 – present;
Dr Robert Bewley	Project Director	2015 – 2020
Dr Bijan Rouhani	Senior Researcher	2016 – present
Dr Neil Brodie	Senior Researcher	2016 – present
Dr Jennie Bradbury	Researcher	2015 – 2018
Dr Michael Fradley	Researcher	2015 – present
Dr Richard Jennings	IT & GIS Officer	2015 – 2016
Dr Nichole Sheldrick	Researcher	2015 – present
Dr Andrea Zerbini	Researcher	2015 –2018
Rebecca Repper(née Banks)	Research Assistant, full-time	2015 – 2017

Period when the claimed impact occurred: 2016 - 31 Dec 2020

Is this case study continued from a case study submitted in 2014? N

1. Summary of the impact *(indicative maximum 100 words)*

Creating information on archaeological sites at risk from damage is a prerequisite for better protection. The adoption and use of the EAMENA (Endangered Archaeology in the Middle East and Northern Africa) database by heritage professionals in Yemen, Palestine, and Jordan has led to those countries being able to create their own national heritage inventories, and improved understanding and preservation of archaeological sites. The project's focus on satellite imaging has also led to changes to satellite policy in the US, with implications for human rights monitoring in the MENA region.

2. Underpinning research *(indicative maximum 500 words)*

In the early 2010s, the events of the Arab Spring saw systemic material damage to heritage sites in the region. In response, a team of archaeologists at the University of Oxford decided to use their skills to address how satellite and aerial archaeology could aid heritage protection in the MENA (Middle East and Northern Africa) region. Their expertise and experience was initially honed through collaboration on projects such as Historic England's National Mapping Programme (NMP), which was created to help understand archaeological sites visible from the air with a view to protecting a sample of them, and the EAMENA's precursor Aerial Photographic Archive for Archaeology in the Middle East (APAAME – previously hosted at the University of Western Australia, and hosted at the University of Oxford from 2015 onwards). APAAME research produced at the University of Oxford which fed into later research is visible in **R1**.

In 2015, Wilson and Bewley formed EAMENA (Endangered Archaeology in the Middle East and Northern Africa). EAMENA uses publicly available satellite and aerial imagery, maps and published sources to record and assess archaeological sites in the MENA region. This information is recorded in the EAMENA database (https://database.eamena.org); an accessible database for research and heritage management, which is built using Arches - an open-source platform supported by the Getty Conservation Institute and World Monuments Fund, which means it is purpose-built for and freely accessible to heritage professionals. The methodology for the project, and early findings for Jordan, Yemen and Saudi Arabia are outlined in **R1**.

EAMENA is a collaboration led by the University of Oxford (Wilson and Bewley, supported by 18 researchers), with partners at Leicester (Louise Rayne, David Mattingly), Durham (Graham Philip), and Isber Sabrine (Institucion Milá y Fontanals, Spain). The Oxford team, as leads, have together developed the database structure (Jennings, Zerbini and Fisher), the methodology for data recording, condition assessment, and data analysis (contributed to by whole team). Each partner has taken the lead for a particular geographical sphere: **Oxford**:

(Jordan, Palestine, Yemen, Egypt, Saudi Arabia, Oman, UAE and Mauritania)**; Leicester**: (North Africa – Libya, Tunisia, Algeria and Morocco); and **Durham** (Syria, Iraq, Lebanon).
As a result of the team's research since 2015, the EAMENA database [**R1**] contains over 309,000 records of heritage sites across the MENA region, approximately 75% of which have not previously been digitally recorded. The data are used for research, on the distribution of sites (by date, function and form), and threats to those sites; conflict, looting, urban development, infrastructure projects, agriculture, mining, natural erosion and climate change [**R2**]. The research has provided evidence which countered conventional expectations: for example, in Egypt, despite claims that looting was the major threat to archaeological sites, the EAMENA research, on 9,000 sites over 50,000 km^2, showed that although looting was a serious problem, the indiscriminate bulldozing of sites in the Eastern Desert had caused far more widespread destruction by comparison [**R3**]. As well as analysing the nature of these threats, the data have also been used to assess the likelihood and pattern of threats to those sites: for example, Brodie has documented the illicit trade in cuneiform tablets (Iraq) and ancient coins (Syria) [**R4**].

Jordan, Yemen and Palestine
In Jordan the project built on the foundation of the APAAME project to collate information on several thousand sites and assess threats to them – notably agricultural intensification, urban population expansion, and road building. In particular, the research focused on landscapes threatened by road building – the Amman and Azraq bypasses, and the Madaba ring road [**R1**]. In Yemen, the research identified c. 8,500 unrecorded sites across 3000^2 km [**R5**]**,** with J. Schiettecatte (Centre National de la Recherche Scientifique, Paris), and later verified war damage, providing impartial and scientific reports on the aerial bombing of a religious site on Jabal an Nabi Shu'ayb (2017), and damage to the archaeological site of al-Qawbah by explosives (2020). No other project has attempted to rapidly record archaeological sites in as many countries. The research has also explored the use of satellite imagery in areas where it has been deliberately downgraded. Research by Zerbini and Fradley [**R6**] urged reform of the Kyl-Bingaman amendment which since 1997 has prevented US satellite operators from distributing high-resolution imagery of Israel and the Occupied Palestinian Territories. Their article outlined how these restrictions reduced the ability of researchers to identify and record archaeological sites by restricting this visibility, and indicated that higher-resolution imagery was already accessed by commercial satellite operators in the same region.

3. References to the research *(indicative maximum of six references)*

R1. Bewley, R. H., Wilson, A. I., et al (2016). 'Endangered Archaeology in the Middle East and North Africa: Introducing the EAMENA Project', in S. Campana, R. Scopigno, G. Carpentiero and M. Cirillo (eds), CAA2015. *Keep the Revolution Going: Proceedings of the 43rd Annual Conference on Computer Applications and Quantitative Methods in Archaeology* (Archaeopress Archaeology), 919–932. Oxford: Archaeopress. https://repository.brynmawr.edu/arch_pubs/166/ [output type: C]
R2. Rayne, L., Bradbury, J., Mattingly, D., Philip, G., Bewley, R., and Wilson, A. I. (2017). 'From Above and on the Ground: Geospatial Methods for Recording Endangered Archaeology in the Middle East and North Africa', *Geosciences* 7: article no. 100. https://doi.org/10.3390/geosciences7040100 [output type: D]
R3. Fradley, M. and Sheldrick, N. (2017). 'Satellite imagery and heritage damage in Egypt: a response to 'Satellite evidence of archaeological site looting in Egypt: 2002–2013' (Parcak et al. 2016)', *Antiquity: a quarterly review of archaeology* 91: 784–92. https://doi.org/10.15184/aqy.2017.25 [output type: D]
R4. Brodie, N. and Sabrine, I. (2018). 'The illegal excavation and trade of Syrian cultural objects: A view from the ground', *Journal of Field Archaeology* 43: 74–84. https://doi.org/10.1080/00934690.2017.1410919 [output type: D]
R5. Banks, R., Fradley, M., Schiettecatte, J. and Zerbini, A. (2017). 'An integrated approach to surveying the archaeological landscapes of Yemen', in J. Starkey (ed.) *Proceedings of the Seminar for Arabian Studies*, 9–23. Oxford: Archaeopress. https://www.jstor.org/stable/45163444 [output type: C]

R6. Zerbini, A. and Fradley, M. (2018). 'Higher resolution satellite imagery of Israel and Palestine: Re-assessing the Kyl-Bingaman Amendment', *Space Policy* 44-45: 14–28. https://doi.org/10.1016/j.spacepol.2018.03.002 [output type: D]

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4. Details of the impact (indicative maximum 750 words)

Capacity building for heritage professionals in the MENA region

The research which designed, created, and populated the database formed the basis for 22 training workshops in satellite imagery interpretation, GIS techniques, and the use of the EAMENA database [**R1**] for 160 heritage professionals from the Department of Antiquities in 8 countries: Tunisia, Libya, Egypt, Palestine, Lebanon, Jordan, Iraq, and Yemen [**E1**]. The training workshops were funded by the British Council's Cultural Protection Fund, with the award held at the University of Oxford as the project lead, and delivered by Training Managers based in Oxford, Durham and Leicester. Workshops took place between November 2017 and November 2019. Trainees learned from the database how to identify sites from satellite imagery, recording location, chronology, and threat assessments. Trainees used the skills taught during the training to systematically record and survey archaeological sites and to identify and understand the impact of different development projects on heritage sites. A Lebanese trainee said in the workshop feedback:

> *'The basic and the advanced training of the EAMENA programmes has helped me to add several important elements in my archaeological work. Firstly, I can now determine the archaeological site by remote sensing. Secondly, I can identify potential risks to archaeological sites such as rapid urbanisation or agri-business etc. Thirdly, with the generated data and the scientific tools that have been taught, I have begun to explore research questions. And the important point is that I am able to do all these from my office.'* [**E1**]

Over 90% of the 40 Libyan and Tunisian workshops attendees (2017-2018) reported in training feedback [**E1**] that the database skills are relevant to their current jobs, and they would strongly recommend the workshops to other colleagues as well.

Heritage management and protection: Country-specific inventories for Palestine, Jordan, and Yemen

Training on the EAMENA database for the Departments of Antiquities of Palestine, Jordan, and Yemen, and EAMENA's *Protecting the Past* conferences (featuring presentations on the team's work to members of these Departments) in 2017–2019 led to requests by the heads of those Departments for national inventory databases, based on the EAMENA database, to be used to manage their cultural heritage, and assess and mitigate threats (**E2**, **E4**, **E6**). The signed agreement with Palestine from March 2018 [**E2**] directly acknowledges the '*intensive training*' provided by the EAMENA team, and that '*the MoTA* [Ministry of Tourism and Antiquities] *has agreed that such [a] national heritage platform should be based on the EAMENA system'*. As well as the development of this platform, it proposes a formal joint working-group with EAMENA to create this database according to Palestinian needs, and also commits to '*training and capacity building for the Palestinian Department of Antiquities and Cultural Heritage (DACH) via the EAMENA methodology*'.

In an evaluation interview undertaken by the EAMENA team in March 2019, the Director-General of Antiquities for Palestine said how EAMENA had improved the existing cultural heritage database, and how it has quickly been taken up by their department:

"*The existing MOTA database is difficult to use and needs advanced GIS skills and Autocad. It is not user-friendly. Not all staff can use it for research and data entry. Also, there is no digital access to it. But the EAMENA database is easy to use by local staff and academics for research and data management. Researchers, academics, and heritage professionals in Palestine have access to its online digital system.*

The government is working on a new Palestinian National Spatial Plan, including cultural heritage and archaeology. The EAMENA-based database can be part of that plan at the national level.

MOTA staff are currently using the EAMENA database in their daily work for heritage protection and impact assessment. The database has also helped MOTA for public outreach and awareness raising." [**E3**]

Similarly, Jordan's cultural heritage management system (MEGA-Jordan), also needed updating. It lacked many features of the EAMENA database. As a result of the training the Department of Antiquities (DoA) asked EAMENA for a Jordan-specific version of the EAMENA database. DoA training on the prototype of the new platform began in November 2019, following the signature of the agreement [**E4]**. Covid-19 has delayed implementation, but as of December 2020, the database team from Jordan's DoA have now been trained in the EAMENA v3 database, which is the prototype of the new platform for Jordan. They had a chance to test the new system by creating new records. They will keep their access to the EAMENA's central database in order to undertake further testing and a review for the creation of their own customised database. Despite these delays, staff of the Department of Antiquities of Jordan have already used the database to analyse and monitor threats to the archaeology of Jerash (video, **E5**), in particular updating the watch list of the most threatened significant archaeological sites. In December 2020, all Jordanian trainees produced a watch list of the most threatened and significance sites in their region/area of work. In total the trainees have compiled records for 66 sites, monuments, and features so far.

Yemen had no database to manage cultural heritage sites, nor even a comprehensive paper list. The signed agreement of July 2017 [**E6**] between EAMENA and the General Organization of Antiquities and Museums (GOAM) agreed to the development of a Yemeni Heritage Management Platform (YHMP), '*which will be extracted from the current EAMENA platform that is based on the open source ARCHES v.3 system'*. The EAMENA team developed this YHMP, populated with about 37,000 records, and trained Yemeni staff in January 2020. **E6** recognises that the need for YHMP had been identified by the UNESCO Doha Office, who are also part of the partnership supporting the aims of the agreement. At the time of the agreement, it was noted that *'the majority of experts and staff* [of GOAM]*… cannot reach most of these archaeological and heritage sites in Yemen due to the security situation'* [**E6**]. Planned training led by the EAMENA team was due to take place in 2020, but Covid-19, as well as infrastructure problems, have delayed this. However, the agreement ensures a legal commitment to the creation of the first digital heritage monitoring platform for the country.

UNESCO are not the only arm of the UN to benefit from EAMENA findings: in 2016, the EAMENA team submitted evidence to the UN's Special Rapporteur on Human Rights. Special Rapporteurs conduct fact-finding missions to assess and verify allegations of human rights abuses. Her report to the UN General Assembly, on international heritage destruction and human rights, cited EAMENA 4 times in footnotes – most notably, drawing attention to particular examples of heritage sites that have been at risk, or destroyed by both states and non-state actors. These include destruction of '*Coptic churches and monasteries in Egypt, Jewish sites in Tunisia, and hundreds of shrines belonging to the Sufi sect of Islam across Northern Africa*' (**E8**, p.12, ft.26) and how '*Sometimes actions of States and non-State actors affect the same site in succession, as has been alleged to be the case in Palmyra, for example*' (**E8**, p.12, ft.29). As such, the EAMENA research has helped **to inform and verify understanding** of heritage protection issues at the highest possible international level.

Impact on US satellite policy

Since the publication of **R6** in 2018, Zerbini and Fradley have collaborated with al-Shabaka, a New York-based Palestinian policy network regarding their work on the US Kyl-Bingaman Agreement (KBA). According to the Managing Director of al-Shabaka, their US Policy Fellow '*found the work compelling and important, she began exploring ways to work with Drs. Fradley and Zerbini on the issue and to advocate for policy change in the US through writing and outreach*' [**E8**]. This resulted in a '*widely-read commentary and policy memo on the subject – and later a longer policy brief that also addressed the KBA'* [**E8**]. She goes on to testify that in her 2018 appearance at the National Oceanic and Atmospheric Administration (NOAA) committee (responsible for the oversight of the KBA) she '*posed questions put together in partnership with Dr. Fradley*', who also attended in-person. After an initial rejection in 2018, al-Shabaka maintained pressure and was '*also able to seek help from interested parties in the US Congress to further challenge NOAA*'. In July 2020, the NOAA announced it was changing its policy, saying '*satellite imagery of Israel is readily and consistently available from non-U.S. commercial sources. The Department has therefore changed the existing resolution limit of 2.0 m GSD to 0.4 m GSD*' [**E9**]. The ready availability of non-US commercial sources was one of the key findings of **R6**, and a key component of al-Shabaka's policy engagement publications. The NOAA's response aligned with all of the recommendations made by **R6**.

The relaxation of this restriction allows much greater visibility of sites on the ground, allowing the identification of more sites and better assessment of threats to them. By allowing greater access to cultural and heritage sites, this overturning also represents a significant change for human rights monitoring in the Occupied Palestinian Territories. Major NGO Human Rights Watch have confirmed the significance of this change, with the Israel and Palestine Director saying *'Human Rights Watch across the world uses satellite imagery both to help document and to illustrate grave human rights abuses…the lack of high-resolution imagery has inhibited us from doing this sort of work in Israel-Palestine. We welcome the reform of the Kyl-Bingaman Amendment, which we understand in part grew out of the research and campaigning of Zerbini and Fradley at the University of Oxford, as it offers the possibility to enhance our reporting on Israel-Palestine'* [**E10**].

5) Sources to corroborate the impact *(indicative maximum of ten references)*

E1. Training workshop feedback report from EAMENA-trained professionals/organisations
E2. Request from Department of Antiquities of Palestine for the establishment of a Palestinian Heritage Management Platform based on EAMENA methodology
E3. E-mail with confirmation of interview notes with Director-General of the Department of Antiquities in Palestine.
E4. Request from Department of Antiquities of Jordan for the development of a new Heritage Management Platform for Jordan based on EAMENA methodology (a); and action plan (b).
E5. Video of *Protecting the Past* conference talk by heritage professional in Jordan, on DoA's use of EAMENA database to assess and monitor heritage of Jerash. [Recording, available upon request]
E6. Request from General Organisation of Antiquities and Museums, Yemen, to develop the Yemeni Heritage Management Platform (YHMP).
E7. Report of the Special Rapporteur in the field of cultural rights, UN General Assembly - Aug 2016
E8. Letter from Israel and Palestine Director, Human Rights Watch
E9. Minutes from meeting of US NOAA Committee on Kyl–Bingaman Amendment.
E10. Letter from Managing Director, al-Shabaka (Palestinian policy network)