Institution: Queen's University Belfast

Unit of Assessment: 15

Title of case study:

World Heritage: Strengthening Management through Collaboration and Research on Four Continents

Period when the underpinning research was undertaken: 2013 - 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:
Malone, Caroline	Professor	2007 - present
Rabett, Ryan	Senior Lecturer	2015 - present
Megarry, Will	Senior Lecturer	2016 - present

Period when the claimed impact occurred: 2013 - 2020

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

1. Summary of the impact

Queen's University staff from Archaeology and Paleoecology disciplines work directly with communities across the world, engaging with heritage organisations (such as the World Heritage Centre, ICOMOS, IUCN, The National Trust), as well as corporate and government ministries. In particular, Queen's research at World Heritage Sites on four continents has promoted and shaped heritage management best practice and capacity building, advancing public engagement through diverse media; and has helped develop local legislative policy and global protection plans. This work has brought significant scientific depth and technological advance to the understanding and sharing of the world's heritage, and promotion of its future sustainability.

2. Underpinning research

Between 2013 and 2020, Queen's University staff from Archaeology and Paleoecology (ArcPal) have researched at 10 UNESCO World Heritage sites (WHS) on four continents, with wide-ranging and measurable impact in these and other protected areas. These are:

- The Hal Saflieni Hypogeum, Malta (Malone);
- The Megalithic Temples - Ġgantija, Ħaġar Qim, Mnajdra, Skorba, Ta' Ħaġrat and Tarxien - of Malta (Malone);
- The Sinharaja Forest Reserve, Sri Lanka (Rabett);
- The Trang An Landscape Complex, Vietnam (Rabett);
- The Historic Mosque City of Bagerhat, Bangladesh (Megarry);
- Rapa Nui National Park, Polynesia (Megarry);
- Chan Chan Archaeological Zone, Peru (Megarry);
- The Old and New Towns of Edinburgh, Scotland (Megarry);
- The Ruins of Kilwa Kisiwani, Tanzania (Megarry);
- The Giant's Causeway and Causeway Coast, Northern Ireland (Megarry).

Their research and engagement have brought lasting impact on policy and heritage decision making, as well as cutting-edge technologies and scientific practice to new places and

communities, enabling accurate and informed contributions that promote heritage protection in tandem with socio-economic well-being.

References **[R.1]**, **[R.2]** and **[R.3]** reflect the most recent outputs from over 30 years of collaborative research by **Malone** on the islands of Malta and Gozo, including the ERC-funded FRAGSUS project (2013-18; **Malone** was PI) which explored insularity, adaptation and resilience to environmental change in the Neolithic using landscapes, sites and human remains. That research, which included archaeological, anthropological and environmental investigations and interpretation of two WHS (The Hal Saflieni Hypogeum and The Megalithic Temples of Malta), prompted a series of documentaries by Smithsonian Films and other film makers, and had a transformative effect on the permanent content of museum exhibitions, site presentation, popular literature, heritage interpretation and conservation in Malta and Gozo. The research has collaboratively, with the national university and heritage bodies of Malta, explored and interpreted the significant impact of climate change and soil erosion on Malta's heritage landscapes, monuments and ecology, leading to informed understanding of Malta's early history of colonisation and its human population story.

References **[R.4]** and **[R.5]** are recent multi-proxy outputs from **Rabett's** 13 years of research in Tràng An, Vietnam. Both articles present results from his AHRC/Xuan Truong Construction Enterprise-funded SUNDASIA project (2016-21; **Rabett** is PI) that is using archaeological and palaeoenvironmental evidence to explore how cultural and biological communities adapted to past cycles of coastal inundation in the Red River Delta. Article **[R.4]** presents the results of research from a late Pleistocene sequence that highlights the longevity of human occupation in Tràng An, but also the comparative resilience of limestone karst forest to the effects of climate-driven environmental change, a finding that demonstrates the conservation value of this and similar settings in combating current climate and biodiversity crises. Reference **[R.5]** demonstrates that mangrove forest elements, which colonised parts of the Tràng An interior *ca*. 8000 years ago, survived for millennia after the local coastline had retreated. With coastal ecosystems recognised as vital to climate-change adaptation, these results suggest that mangrove rehabilitation within Tràng An and comparable locations could create stable forest cores, capable of helping to limit impacts from predicted regional sea-level rise.

Reference **[R.6]** frames research by **Megarry** on World Heritage management. It explores the intersection between technology and site management, specifically, how non-invasive technologies can be used to manage World Heritage properties in Ireland, Moldova and the USA. It includes boundary demarcation and inventory and has also explored how geospatial analysis can be used to better understand and communicate the outstanding universal value (OUV) of these places.

3. References to the research

R.1 FRAGSUS Monographs: Cambridge: McDonald Institute for Archaeological Research. Vol. 1. 2020. Temple Landscapes: Fragility, change and resilience of Holocene environments in the Maltese Islands. French, C., Hunt, C., Grima, R., Stoddart, S., McLaughlin, R. & **Malone, C.** (eds). https://www.repository.cam.ac.uk/handle/1810/312514

R.2 FRAGSUS Monographs: Cambridge: McDonald Institute for Archaeological Research. Vol. 2. 2020. **Malone, C.,** McLaughlin, T., Stoddart, S., Parkinson, E.W., & Vella, N. (eds). Temple Places: excavating sustainability in Prehistoric Malta. https://www.repository.cam.ac.uk/handle/1810/315524

R.3 Barratt, R., **Malone, C.**, McLaughlin, T.R. and Parkinson, E.W. 2020. Hypogea and the clubhouse: Neolithic Malta's houses of the living and houses of the dead. In Houses for the dead? Neolithic Studies Group Seminar papers 17. Barclay, A., Field, D. & Leary, J.

(eds.). Oxford: Oxbow, Vol. 17. p. 15-37. https://www.oxbowbooks.com/oxbow/houses-of-the-dead.html

R.4 Rabett, R., Ludgate, N., Stimpson, C. *et al*. 2017. Tropical limestone forest resilience and late Pleistocene foraging during MIS-2 in the Tràng An massif, Vietnam. *Quaternary International* 448, 62-81 http://dx.doi.org/10.1016/j.quaint.2016.06.010

R.5 O'Donnell, S., Huong, N.T.M., Stimpson, C., Holmes, R., Kahlert, T., Hill, E., Vo, T and **Rabett, R.** 2020. Holocene development and human use of mangroves and limestone forest at an ancient *hong* lagoon in the Tràng An karst, Ninh Binh, Vietnam. *Quaternary Science Reviews* 242 https://doi.org/10.1016/j.quascirev.2020.106416

R.6 Megarry, W., Davenport, B. and Comer, D. 2017. Emerging Applications of LiDAR / Airborne Laser Scanning in the Management of World Heritage Sites. *Conservation and Management of Archaeological Sites* 18.4, 393 https://doi.org/10.1080/13505033.2016.1290481

4. Details of the impact

QUB research has directly impacted the inscription, management and presentation of World Heritage Sites in multiple countries. Working in collaboration with international heritage organisations, it is helping to define best practice and build sustainable and effective implementation of future heritage conservation.

Malta and Gozo – Balancing Protection and Promotion (Prof. Malone)

Through her role (as PI) in the initiation and delivery of the ERC FRAGSUS (2013-2018) Project (Value: EUR2,400,000; References **[R.1]**, **[R.2]** and **[R.3]**), **Malone** has supported an interdisciplinary research team in focusing on key issues of site and landscape survival, set within wider goals that explore and interpret the Neolithic origins of Maltese civilisation. The studies inform the best protection and management practices of WHS heritage resources in a very pressured and rapidly deteriorating environment in a small island state, feeding positively into Museum/Site interpretation in an economy heavily reliant on tourism **[S1]**:

A Professor of Archaeology and former Head of Department from University of Malta mentioned **[S1A]**:
*'…The FRAGSUS project…contributed substantially towards the **training of technical and professional personnel to manage the archaeological heritage**…A number of them ended up lecturers, and even professors, at the University of Malta, as well as overseas…Others manned the two state agencies in charge of the protection and management of the islands' cultural heritage, namely, the Superintendence Cultural Heritage and Heritage Malta, the latter taking up the curatorship of all the major sites and museums,…occupying in succession the chief post of one of the agencies, the Superintendent of Cultural Heritage'.*

The Maltese Superintendent of Cultural Heritage stated **[S1B]**:
*'The results of investigations and research emanating from the FRAGSUS project also provided benefits locally in terms of improved interpretation of narratives for **museological, educational and tourism purposes, the latter being a major driving force of Maltese economy**.'*

The officer in charge Cittadella Administration Office stated **[S1C]**:
*'Their research has contributed significantly towards better and more accurate interpretation, display of artefacts and sites as well as conservation issues related to such sites…**has transformed our knowledge and beliefs about this important culture**'.*

The exploration of environmental instability as a key stimulus that triggered Temple monument building in the Neolithic has brought international documentary film makers to FRAGSUS in

reinterpreting the origins of the WHS temples and tombs of Malta, with world-wide impact on millions of viewers **[S2]**.

The Executive Producer of Smithsonian Networks commented **[S2A]**:
'The new research has revealed numerous lines of inquiry…to ***a very large and enthusiastic audience****…Since the film premiered on Smithsonian Channel in September of 2018,* ***it has been seen by a 1.03 million viewers in the US alone…and broadcast stations throughout Europe, Latin America, Brazil and Asia…****'*

The producer from Rare TV noted **[S2B]**:
*'..the extensive archaeological work and analysis led by Professor Caroline Malone on behalf of the Fragsus Project in Malta… with a great wealth of material in the form of images and footage related to the research... We wouldn't have been able to bring this story to Discovery Science's audience without the help of the Fragsus team…with …****an impact on a great cross section of the public and offers educational, scientific and indeed, conservation understanding in an accessible way****.'*

Vietnam – Securing past and present-day communities (Dr. Rabett)

Through lead authorship of the cultural case for support in Tràng An's 2014 inscription, and as director on a subsequent GBP1,200,000 project (SUNDASIA) **[S3, S4]**, **Rabett** has, according to the Vietnam Ambassador to UNESCO, provided *'…unequivocal archaeological evidence [enabling] the State Party of Vietnam to claim in its* ***World Heritage submission*** *that Trang An is the most outstanding locale within Southeast Asia…'* **[S4]**; and has defined management of this property, especially in its Archaeological Heritage Management Action Plan **[S5.A]**. Inscription has brought strict limits to development, mitigating the risk of destruction from extractive industries while boosting the local economy. This is illustrated by an eight-fold income rise between 2005-2016 (Truong Yen Commune) and visitor increase from 2,200,000-2,900,000 per year (2015-18), as noted by Ms Tran Thi Hoang Mai. *Tripadvisor* (12/2020) rates Tràng An 4.5/5 (+2600 reviews) and SUNDASIA has been recognised by UNESCO as a model for future research **[S5.B]**. Leadership in sustainable management practice has included spearheading collaboration between local NGOs, government and industry to reintroduce a Critically Endangered primate **[S.6]** as well as funding conservation training for 60+ local staff, a documentary and accompanying exhibition. At the behest of property management and UNESCO recommendation **[S5.C]**, **Rabett** is also leading design and installation of an innovative outdoor exhibition space to showcase Tràng An's archaeological and natural heritage. Such actions will promote a better understanding of human impact and interaction with tropical biodiversity going forwards and over the long-term past.

Global Cultural Heritage Management and Climate Change (Dr. Megarry)

Through ongoing work at world heritage properties in the UK, Tanzania, Bangladesh and South America, **Megarry's** research has, according to the Director General of International Council on Monuments and Sites (ICOMOS), resulted '*in increased global awareness and substantial changes* ***in site management and recording and monitoring the impacts of climate change****… at a range of scales from individual sites to national and international heritage organisations"* **[S7]**. **Megarry's** work with ICOMOS as a bureau member of the Working Group on Climate Change and Cultural Heritage included lead authorship of the *Futures of our Pasts* **[S8]** report which mapped the intersection between climate change and cultural heritage. It also included the coordination of the 'Heritage on the Edge' project which used iconic World Heritage to stress urgency about climate change. Since its launch in January 2020, this has been seen by over 500,000 people in 217 countries. This project included training with WHS managers in 3D recording methodologies at five global WHS (Bangladesh, Peru, Rapa Nui, Scotland and Tanzania) to record baseline data and monitor change **[S9]**. **Megarry** has also run training at the UNESCO WHS manager's forum (Bahrain 2018) and the Arab Regional Centre for World Heritage (2020). Closer to home, he is working

with the National Trust as an expert scientific advisor to Project Edgar **[S10]**, a major initiative by the National Trust to manage increasing visitor numbers to the Causeway Coast and Giants Causeway WHS in Northern Ireland. He is also PI on a new AHRC-DCMS-funded project focused on climate impact assessment and training on the African continent (Dec 2020) **[S11]**.

5. Sources to corroborate the impact

S1. Training, cultural and touristic impact of Prof. Malone's work:
- **A.** *Letter from the Professor of Archaeology and former Head of Department from University of Malta*
- **B.** *Letter from The Maltese Superintendent of Cultural Heritage*
- **C.** *Letter from the Officer in charge Cittadella Administration Office*

S2. Media impact of Prof. Malone's work:
- **A.** *Letter from the Executive Producer of Smithsonian Networks*
- **B.** *Letter from the Producer of Rare TV*

S3. Letter from the Member of the International Union for Conservation of Nature (IUCN)

S4. Letter from the Vietnam Ambassador to UNESCO

S5. UNESCO documents highlighting management of the Heritage in Vietnam by Dr. Ryan Rabbett:
- **A.** *https://whc.unesco.org/document/165143*
- **B.** *https://whc.unesco.org/document/183365 (p.33 and p.38)*
- **C.** *https://whc.unesco.org/document/179778 (p.10)*

S6. Nadler, T., Rabett, R., O'Donnell, S. & Nguyen T. M. H., 2020. Delacour's langur (*Trachypithecus delacouri*) reintroduction program: A preliminary report on the trial release into the Trang An UNESCO World Heritage Site, Ninh Binh Province, Vietnam. *Vietnamese Journal of Primatology* 3(2) 39-48.

S7. Letter from the Director General of International Council on Monuments and Sites (ICOMOS)

S8. https://www.icomos.org/en/focus/climate-change/59522-icomos-releases-future-of-our-pasts-report-to-increase-engagement-of-cultural-heritage-in-climate-action

S9. Heritage@Risk Portal https://artsandculture.google.com/project/heritage-on-the-edge

S10. https://www.belfasttelegraph.co.uk/news/northern-ireland/study-to-examine-impact-of-rising-visitor-numbers-on-giants-causeway-38021490.html

S11. Feedback surveys from ARC training sessions