

Impact case study (REF3)

Institution: University of Nottingham (UoN)		
Unit of Assessment: 29 Classics & Archaeology		
Title of case study: Conservation, Education and Cultural Awareness: changing policy and public understanding of international fallow deer populations		
Period when the underpinning research was undertaken: 2005 – 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:
Dr Holly Miller Professor Naomi Sykes Dr Julie Daujat	Assistant Professor in Archaeology Professor in Archaeology Research Affiliate in Archaeology	01.10.2012 – present 01.09.2006 – 31.12.2018 01.11.2014 – present
Period when the claimed impact occurred: 2013-2020		
Is this case study continued from a case study submitted in 2014? No		
<p>1. Summary of the impact (indicative maximum 100 words)</p> <p>University of Nottingham research has transformed knowledge of the timing, circumstances, and cultural impact of the human-instigated, global distribution of fallow deer populations. It shows that many contemporary issues in fallow deer management and conservation directly reflect historical changes to geographical and biocultural circumstances. Impact has been achieved by using this understanding to:</p> <ol style="list-style-type: none"> 1. Change deer management guidance and conservation policies of specialist interest groups, deer managers and conservation organisations in the UK, Barbuda and in the International Union for Conservation of Nature's (IUCN) Red List. 2. Create, and stimulate the creation of, interdisciplinary educational resources for the public in the UK and Barbuda. 3. Transform awareness of the significance of fallow deer for heritage and environment sector practitioners in the UK and Barbuda and, in turn, the communities they engage. 		
<p>2. Underpinning research (indicative maximum 500 words)</p> <p>At the University of Nottingham, Sykes (UoN 2006 – 2018) led a transdisciplinary team, including Miller (UoN 2012 – present), Daujat (UoN 2014 – present) and Karis Baker (based at Durham University), of archaeologists, geneticists, geochemists, art historians and anthropologists in research that transformed understanding of fallow deer. The AHRC-funded 'Dama International: Fallow deer (<i>Dama dama dama</i>) and European Society 6000 BC - AD 1600' project (2012-2015) delivered the first transdisciplinary programme of research into the most widely distributed deer species on the planet. In 2014, the reach of this work was extended to include the Mesopotamian fallow deer subspecies (<i>D.d mesopotamica</i>) through research by Daujat. The results have radically changed understanding of the timing, circumstances, and bio-cultural impact of fallow deer species across the world, from prehistory to the present.</p> <p>This research shows that fallow deer are an excellent proxy for human diasporas, both physical and ideological. The timing and location of fallow deer introductions beyond their native range are the result of successive human actions. The research has shown that this was motivated by human attitudes towards the dominance of nature: that wild animals, a living representation of the wilderness, could be managed, bringing order to the natural world. These attitudes were discussed by Columella and Varro, writing at the time fallow deer were first being introduced to Western Europe. The team have demonstrated that similar worldviews drove subsequent translocations of the species in Medieval Europe and across the globe as part of colonial expansion to the 'New World'. UoN-led transdisciplinary investigations of the physical and cultural circumstances of fallow deer through time has provided interpretation that is impactful for a range of disciplines and audiences. Three key results of this research served to underpin the subsequent programme of impact:</p> <p>(1) Understanding when historical fallow deer populations were translocated, and the associated cultural reasons for doing so. Received wisdom suggested that fallow deer were native to Anatolia (modern-day Turkey), but the research identified previously unknown glacial refugia for the species (1). Fallow deer became culturally important within these native distributions in ways that later influenced Greek and Roman culture (2). From the 1st</p>		

century AD, fallow deer were translocated through Europe and into Britain, where they were imparked at high status sites, such as Fishbourne Roman Palace, as symbols of identity and status. Fallow deer are a proxy for the movement of the accompanying people, but also for the movement of cultural ideas and attitudes to the natural world **(2)**.

(2) Identification of an extirpation of Roman fallow deer populations in Britain, with a later re-introduction, spurring the fashion for Medieval deer parks **(3)**. Practices associated with hunting fallow deer became central to society as highly ritualised markers of status **(4)**. Medieval and post-Medieval groups that delighted in fallow deer, took populations with them as they navigated a growing empire. This continued the spread of fallow deer, their cultural significance and associated worldviews **(4-5)**.

(3) Contextualising the present-day problem of overstocking of fallow deer in Britain as a legacy of the introduction of Medieval hunting stock. Associated legacy solutions, like hunting or (in the modern vernacular) culling, are unpopular with the public but management is necessary for deer and environmental health **(5)**. In other parts of the world, modern fallow deer populations have become culturally iconic but have problematic conservation status. In Barbuda, this legacy can be traced to 18th-century colonial movement of fallow deer populations from Britain **(6)**.

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

1. Baker, K.H., Gray, H.W.I., Ramovs, V., Mertzanidou, D., Pekşen, Ç.A., Bilgin, C.C., **Sykes, N.** and Hoelzel, A.R. (2017). Strong population structure in a species manipulated by humans since the Neolithic: the European fallow deer (*Dama dama dama*). *Heredity* 119(1), pp. 16-26. <https://doi.org/10.1038/hdy.2017.11>
2. **Miller, H.**, Carden, R.F., Evans, J., Lamb, A., Madgwick, R., Osborne, D., Symmons, R. and **Sykes, N.** (2016). Dead or Alive? Investigating long-distance transport of live fallow deer and their body parts in antiquity. *Environmental Archaeology* 21(3), pp. 246-259. <https://doi.org/10.1179/1749631414Y.0000000043>
3. **Sykes, N.**, Ayton, G., Bowen, F., Baker, K., Baker, P., Carden, R.F., Dicken, C., Evans, J., Hoelzel, R., Higham, T., Jones, R., Lamb, A., Liddiard, R., Madgwick, R., **Miller, H.**, Rainsford, C., Sawyer, P., Thomas, R., Ward, C. and Worley, F. (2016). Wild to domestic and back again: the dynamics of fallow deer management in medieval England (c.11th-16th century AD) *STAR: Science and Technology of Archaeological Research* 2(1), pp. 113-126. <https://doi.org/10.1080/20548923.2016.1208027>
4. Ward, C., Baker, K., Hall, R., Hoelzel, A.R. and **Sykes, N.**, (2019). In view and under foot: the hidden story of fallow deer, knuckle-bone floors and British estates. *Post-Medieval Archaeology* 53(2), pp. 157-171. <https://doi.org/10.1080/00794236.2019.1654732>
5. **Sykes, N.** and Putman, R. (2014). Management of Ungulates in the 21st Century: How Far Have We Come? In: Putman, R. and Apollonio, M. (eds) *Behaviour and Management of European Ungulates*. Whittles Publishing. pp. 267-289. ISBN: 9781498705745
6. Perdikaris, S., Bain, A., Grouard, S., Baker, K., Gonzalez, E., Hoelzel, A.R., **Miller, H.**, Persaud, R. and **Sykes, N.**, (2018). From icon of empire to national emblem: new evidence for the fallow deer of Barbuda. *Environmental Archaeology*, 23(1), pp. 47-55. <https://doi.org/10.1080/14614103.2017.1349027>
7. Bowen, F., Carden, R.F., **Daujat, J.**, Grouard, S., **Miller, H.**, Perdikaris, S. and **Sykes, N.**, (2016). Dama dentition: A new tooth eruption and wear method for assessing the age of fallow deer (*Dama dama*). *International Journal of Osteoarchaeology*, 26(6), pp. 1089-1098. <https://doi.org/10.1002/oa.2523>

Selected grants that underpin the research conducted

- I. November 2015 – June 2019, Leverhulme Early Career Fellowship (ECF-2015-139) 'Fallow deer in Western Eurasia: bio-cultural history and conservation policy': £76,319 (PI: **Daujat**)
- II. November 2012 – October 2015 AHRC Standard Grant (AH/I026456/1) 'Dama International: Fallow deer (*Dama dama dama*) and European Society 6000 BC - AD 1600: £644,846.00 (PI: **Sykes**)

- III. March 2011, Ungulates Research Group award for 'Deer and People conference' (SH1838): £1500 (PI: **Sykes**)
- IV. Oct 2010, British Deer Society award for 'Deer and People conference' (SH1838): £2,500 (PI: **Sykes**)
- V. June 2010, British Deer Society award for 'Cervids and Society session'(SH1838/A11811) (£100)
- VI. Aug 2009, AHRC Research Leave (AH/H005722/1) 'Publication and dissemination of the Fallow Deer Project': £24,708 (PI: **Sykes**)

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

Globally, fallow deer populations are simultaneously considered to be domestic and translocated, feral and invasive, wild and endangered, locally extinct and subject to rewilding campaigns. This patchwork of understanding and research oversight of the biocultural significance of this species, meant there was little comprehension of how this species came to occupy a wide range of environmental and cultural niches. UoN-led research has addressed this, with outcomes that have shaped conservation policies, changed deer management practices and built sustainable capacity for a wider understanding of the cultural significance of this species around the world.

1. Shape deer management and conservation policies

The International Union for Conservation of Nature's (IUCN) Red List is globally recognised as the most authoritative guide on the status of biological diversity, compiling threats to species, their ecological distribution and requirements, and information on conservation actions that should be taken to reduce risk of extinction. It is consulted by governments, organisations, and individuals to understand and mitigate conservation issues. When updating the Red List entry for Persian fallow deer in 2015, the IUCN executive approached researchers on UoN-led fallow deer projects (**Daujat** and Baker) to contribute to the international guidance on extant but endangered populations in Israel and Iran. 20% of the current (2015) Red List entry has changed from the preceding (2013) entry in areas such as Geographic Range, Threats and Population, directly reflecting input drawn from our research **[A]**.

In Barbuda, where fallow deer are a source of pride and national identity, the effects of Hurricane Irma significantly threatened translocated populations of the species. UoN research **(6)** was used by the director of NGO Barbuda Research Complex, to inform the deer preservation and conservation work on the island **[B]**. As the Director noted: "*The research is the only existing scientific information on the Barbuda fallow deer and in this regard it presents an invaluable resource for the conservation effort, given that the deer is facing extinction... we are now working towards embedding these findings into policy recommendations for Barbuda's government... the findings are providing valuable input to influence governmental priorities regarding the preservation of deer*" **[B]**.

In Britain, the team used findings from our research to change the decision-making practices of organisations and individuals who manage deer. These engagements occurred through 25 talks to special interest groups, such as the British Deer Society, the Deer Initiative, the Ministry of Defence, the Small Woods Association and the National Trust and independent deer managers. Individual events regularly attracted up to 50 people. Leading Deer Welfare Specialist, who consults with all of these groups, and provides veterinary services to c.5000 deer on deer parks and farms in the UK, explained how the research affected this change in practice in three important ways **[C]**:

- 1) Refined the culling strategies of deer managers and deer park keepers through the application of the new method for ageing fallow deer developed by the Dama International team **(7)**, ensuring that herd size is managed through informed decision making.
- 2) Informed new clinical understandings of bovine tuberculosis in fallow deer for deer managers, park keepers and vets, through this more accurate ageing of infected individuals **(7)**, which "will help to protect and care for the herds better but also contribute to minimising the negative financial impact of TB in deer populations".
- 3) Enabled veterinary professionals to persuade deer managers and park keepers to recognise the importance of out-breeding **[C, Dii]**, by challenging pre-conceived notions that

fallow deer across the UK are genetically identical (1); in turn this minimises the health risks associated with closed herds including “reduced fertility and/or increased neonatal mortality.... reduced immunocompetence and ... [increased] susceptibility to parasitism and disease”.

In 2018, Miller provided evidence to the City of London’s *Epping Forest and Buffer Lands Deer Management Review* [Di]. The results have informed 20-year policy and guidance for the management of c.700 fallow deer inhabiting the 7942-acre site [Dii], visited by 4.2 million annually. Head Keeper and Constable, notes that the City of London Corporation “turned to Dr Miller of the Dama International Project for up-to-date research in overhauling...policies. The tender specified that the research outcomes of the Dama International Project were to be considered in the review” [Diii]. Our research highlighted the cultural significance (3, 4) of the forest deer, underpinning all resulting policy to maintain the presence of fallow deer at the site (in contrast to Muntjac populations) [Dii]. An important finding of the research was to confirm that the Birch Hall Sanctuary population is not genetically unique (1), thereby changing the relative status of these deer and the policies by which they are managed by their keepers [Dii].

2. Create, and stimulate others in the creation of, interdisciplinary educational resources

In 2014, UoN Dama International researchers were invited to partner with Fishbourne Roman Palace (2) and Dudley Castle Museum (3) to create major new exhibitions for the independent heritage venues. Both exhibitions had significant reach: the Curator of Fishbourne Roman Palace noted that 30,000 attended the exhibition between September 2014 and March 2015. Feedback from the Palace noted the interdisciplinary nature of the exhibition, including archaeological science and natural history, which enabled them to reach new audiences by departing from their usual stories of Roman architecture [E]. Directly inspired by her visit to the Fishbourne exhibition, author Caroline Lawrence set elements of her children’s book *The Romans Quest: Escape From Rome* (2016) at the site, with reference to fallow deer in the text and explanatory notes [F]. “Your exhibition convincingly argued that fallow deer were introduced by the Romans to the UK for the first time right there at Fishbourne. This was something I was not aware of before... and actually inspired aspects of my novel.” *Escape from Rome* has [text redacted] and c.27 schools are using it as a class reader for Key Stage 2 [Fii].

Another independent volume that draws heavily on UoN fallow deer research is Dan Eatherley’s *Invasive Aliens* (2019), which has sold 3115 copies internationally and was a Sunday Times, Telegraph and Waterstones Book of the Year. The author notes [G]: “In the Dama International Project research I found a species that was particularly emblematic, serving to highlight many of the crucial themes that characterise human relationships with transported species... The research thus helped me appreciate and convey to my readers the complexity of the history of human animal relationships and the circumstances and consequences of introducing new species, not just the fallow deer, but also other species discussed in my book.”

Between 2013 and 2016, the National Trust invited UoN researchers to develop a series of ‘deer unmaking’ events, accompanied by a resource booklet created by the team, centred on the history of ritualised Medieval hunting. These events have been characterised as “provocative, perception challenging and engaging” by National Trust’s Consultancy Manager [H]. They raised wider public awareness of the cultural role of fallow deer at historic houses and changed public perception of the role of hunting: Hall notes that this is “now part of the Trust’s narrative at sites with a historical connection to fallow deer,” [H], examples include Studley Royal (Yorks), Charlecote (War), Calke Abbey (Derbs), Lyme Park (Ches), Holnicote Estate (Som), Dyrham Park (Glos), Knole (Kent), Dunwick Heath (Suff), Hatfield Forest (Essex) and Powis Castle in Wales.

Rollout of educational resources at Epping Forest (June 2020, [Diii]) and Barbuda (July 2020, [B]) have been postponed due to COVID-19 restrictions (COVID statement).

3. Transform awareness of the significance of fallow deer for heritage and environment sector practitioners

As a result of UoN-led research, the team built capacity amongst heritage and environment sector workers to raise wider public awareness of the fallow deer they managed in provocative and engaging ways, changing the outlook of the practitioners to this species, and therefore the information and interpretation that is presented to the public across a number of sites important to environmental and cultural heritage across the UK [D, E, H]: The impact at Fishbourne Roman Palace included changing the way that curators, staff, and volunteers view the site, engage the public, and approach research with other Higher Education Institutions. Head Curator noted: *“the story [of the Fishbourne fallow deer] (2) has been embraced by all of our staff here and is now as central to our visitor interpretation as the story of the building and our mosaics. It has also changed staff attitudes towards research at the Palace – the overwhelming feeling now being that research is interesting, relevant and worthwhile – this has led to a desire within the organisation to engage with other projects in the future”* [E].

At the National Trust, our research has been embedded in the training of the staff delivering property tours. For example, at Belton House (Lincs) which receives c.400,000 visitors annually, 60 staff and 300 volunteers now include information on the patching of the knuckle bone floor with fallow deer remains from the herd at the site (4) into their engagements with the public, along with wider research findings (7). Deer managers at the site have also used the research to inform their walks, which take place four times a year with c.20 members of the public, meaning that some 480 people have been exposed to a perception of fallow deer that has been changed by the research [H]. Across the National Trust properties with deer management teams, the team trained stalkers in Medieval ‘unmaking’ techniques (U3), which they have gone on to use as part of their deer management and educational programme. The National Trust notes: *“Medieval-style ‘Deer Unmakings’ at the properties has helped to promote a ‘plot to plate’ approach to the annual cull and venison sales. Since the work of the Dama International Project, the estate has embraced the product as firmly marketed ‘Belton Venison’ where previously there was more circumspection in terms of the origins of our menu offering,”* [H]. Similar planned work at Epping Forest with environment sector professionals by Miller in 2020 was postponed due to COVID-19 restrictions (COVID statement).

As a result of these changes, the Dama International project was identified by the AHRC as an outstanding example of impact and showcased it in their 10th Anniversary publication [I] where it is highlighted that *“An AHRC project has overturned earlier theories about the origins of a much-loved species... the project team have been working with the British Deer Society, the National Trust and inner-city schools to highlight the cultural significance of the fallow deer herds as well as the need to manage the populations — several National Trust properties are now selling fallow deer venison in their gift shops and cafes.”*

5. Sources to corroborate the impact (indicative maximum of 10 references)

[A] Copies of IUCN Red List Entries for Persian Fallow deer in 2013 and 2015, with indicative changes in editions highlighted.

[B] A composite file of evidence pertaining to Barbuda fallow deer, including testimony from the Director of Barbuda Research Complex, and an invitation to conduct an exhibition at the Barbuda Community Centre from the Tourism and Culture Department of the Barbuda Council

[C] Testimony from Deer Welfare Specialist and Veterinarian, British Deer Society

[D] A composite file of evidence from City of London Corporation’s Epping Forest including Epping Forest and Buffer Lands Deer Management Reports and testimony from Head Keeper and Constable

[E] Testimony from the Fishbourne Roman Palace Head Curator

[F] Evidence from Caroline Lawrence, author of *The Romans Quest: Escape From Rome*

[G] Testimony from Dan Eatherley, author of *Invasive Aliens* (2019)

[H] Testimony from the National Trust Consultancy Manager and Archaeologist

[I] *On the Trail of the Fallow Deer*, AHRC Tenth Anniversary Features in print and at

<https://ahrc.ukri.org/research/readwatchlisten/features/onthetrailofthefallowdeer/> 08/01/2021