

Institution: University of Nottingham		
Unit of Assessment: UoA6		
Title of case study: Improving the welfare of captive elephants through international policy and practice changes		
Period when the underpinning research was undertaken: 2011 – present		
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 Lisa Yon	Associate Professor in Zoo and Wildlife Medicine	August 2007 – present
Period when the claimed impact occurred: 2014 – present		
Is this case study continued from a case study submitted in 2014? No		
<p>1. Summary of the impact</p> <p>Research by Dr Lisa Yon at the University of Nottingham has underpinned policy changes through an evidence-based revision of government guidelines on elephant welfare. These are mandated in the UK and the Republic of Ireland, and were assisted by Dr Yon's development of a new Elephant Behavioural Welfare Assessment Tool (EBWAT), also mandated for use across all UK zoos. Since 2015, the implementation of these guidelines and the EBWAT has led to husbandry and management changes in UK zoos, such as an increase in enclosure size (by 58% of facilities) and increased use of sand substrate in indoor enclosures (from 38% to 77%). These changes have led to improvements in the elephants' welfare, with improved foot health (reduction in severe issues from 24% to 10%) and a reduction in abnormal repetitive behaviours observed. Furthermore, the research has led to policy and practice changes and welfare improvements for captive elephants across the world, with facilities in Thailand, Cambodia, Indonesia and southern Africa implementing husbandry changes resulting in substantial welfare improvements.</p>		
<p>2. Underpinning research</p> <p>Background: Problems in managing elephant welfare</p> <p>Elephants have been kept in captivity for hundreds of years. They are long-lived complex animals, whose welfare requirements are varied, stemming from their unique social structure, biology, size, and spatial requirements. In 2008, a UK Government report (Harris, 2008) identified serious issues amongst UK captive elephant collections, including foot problems, obesity, abnormal gaits (likely due to arthritis), and abnormal repetitive behaviours (stereotypies). A subsequent Zoos Forum review (2010) recommended the establishment of an independent Elephant Welfare Group (EWG), through the British and Irish Association of Zoos and Aquariums (BIAZA), to review husbandry guidelines, making updates as necessary, and to advise upon, and monitor progress with, welfare improvements. In 2011, the EWG was established and tasked by the Government Animal Welfare Minister, Lord Henley, to work with the zoos to drive improvements and develop good practices. The EWG was given a ten-year timeframe to show improvement, with Lord Henley stressing '<i>the option of looking at the scope for phasing out the keeping of elephants in the UK in the future if there is little or no evidence of improved welfare</i>' (BIAZA 5 year report, 2016).</p> <p>Research into elephant welfare</p> <p>In 2011, Dr Lisa Yon was appointed as Head of the BIAZA EWG Behaviour Subgroup (2011-), and subsequently as Vice Chair, EWG (2019-), and has led a range of research projects designed to assess and improve captive elephant welfare. Initial research conducted by Dr Yon and her team at the University of Nottingham (UoN) aimed to identify aspects of husbandry, management, and physical and social resources important for captive elephant welfare. For example, one study provided recommendations on sand substrate and overnight social contact that would benefit elephant welfare by facilitating and encouraging lying rest (1).</p> <p>In 2013, the UK Department for Environment, Food and Rural Affairs (DEFRA) commissioned Dr Yon to undertake a research project (G1), with two main objectives:</p> <ul style="list-style-type: none"> • Conduct an evidence-based review of existing UK Secretary of State's Standards of Modern Zoo Practice (SSSMZP) guidelines for elephants in captivity and suggest changes to these. • Create a reliable and validated (as far as possible in the available timeframe) evidence-based behavioural welfare assessment tool for zoo elephants 		

Evidence-based review of the UK SSSMZP guidelines

The previous UK SSSMZP guidelines were largely based on anecdotal evidence because scientific evidence wasn't readily available. Dr Yon and her team thus conducted a detailed and extensively evidence-based review of the SSSMZP guidelines with the aim of ensuring that subsequent legislation for policies and practices at UK elephant-holding zoos were evidence-based. A thorough literature review was conducted to identify social and physical resources of importance to elephant welfare (2), followed by stakeholder input (including researchers, vets, and keepers and managers from 11 British and Irish elephant-holding facilities) to further identify important resources (3). The research identified resources perceived to be of importance to elephants including aspects of the physical environment, such as feeding opportunities and appropriate substrate, and aspects of the social environment, including group size and relatedness. The research findings formed the basis of recommendations to DEFRA for changes to the UK SSSMZP guidelines, spanning all aspects of elephant management in zoos, from social grouping, enclosures, feeding and nutrition, behavioural management and use of physical restraint (2). In total, 34 of the 42 elephant management standards in the SSSMZP were evaluated and evidence-based recommendations made across 27 of the standards (2).

Subsequent research conducted after these recommendations were implemented (detailed in impact section) has confirmed the positive effect of these changes on elephant welfare (4).

Development of a validated Elephant Behavioural Welfare Assessment Tool (EBWAT)

Concurrently, the research outlined above also fed into the development and validation of a new elephant welfare assessment method - the EBWAT. Objective and regular assessment of captive elephant welfare was needed to monitor the impacts of husbandry and management changes over time and to provide evidence of any improvements. The tool needed to be able to detect the differences between individual elephants and recognise the influence of external factors, observing changes over time to give a long-term picture of an elephant's well-being. From their research, Dr Yon and her team identified important elephant welfare indicators for inclusion, including stereotypies, lying rest and positive social interactions, and that a multidisciplinary approach, which included a range of welfare indicators, would provide a more reliable tool (2,3,5). The research also highlighted that keepers have a key role to play in assessing welfare due to their own knowledge of individual elephants in their care. A prototype tool was developed and trialled at five UK zoos, involving 29 elephants (representing 46% of the total UK captive elephant population) to test its reliability and feasibility (6). Following analysis and expert user feedback, the finalised version of the EBWAT was released in 2015 and is providing a rapid and reliable way to monitor changes, over time, in the welfare of captive elephants held worldwide.

The research has been featured in the global mainstream media including the [Associated Press](#), BBC 4 Radio (Interviews on 2 June and 3 August 2017) and [Film the Change](#).

3. References to the research. University of Nottingham UoA6 staff are bold.Underpinning references:

- (1) Williams E, Bremner-Harrison S, **Harvey N**, Evison E, **Yon L**. 2015. An investigation into resting behavior in Asian elephants in UK zoos. *Zoo Biology*. 34: 406-417. <https://doi.org/10.1002/zoo.21235>
- (2) **Yon L**, Williams E, **Asher, L**. 2015. Developing behavioural indicators, as part of a wider set of indicators, to assess the welfare of elephants in UK zoos. DEFRA Project WC1081 Final Report. Bristol, DEFRA. http://sciencesearch.defra.gov.uk/Document.aspx?Document=12816_Elephantwelfarereport_WC1081.pdf
- (3) Chadwick CL, Williams E, **Asher L**, **Yon L**. 2017. Incorporating stakeholder perspectives into the assessment of captive elephant welfare. *Animal Welfare*. 26: 461-472. <https://doi.org/10.7120/09627286.26.4.461>
- (4) **Harvey ND**, Daly C, Clark N, Ransford E, Wallace S, **Yon L**. 2018. Social interactions in two groups of zoo-housed adult female Asian elephants (*Elephas maximus*) that differ in relatedness. *Animals* (Basel). 8: 132. <https://doi.org/10.3390/ani8080132>
- (5) Williams E, Chadwick CL, **Yon L**, **Asher L**. 2018. A review of current indicators of welfare in captive elephants (*Loxodonta africana* and *Elephas maximus*). *Animal Welfare*. 27: 235-249. <https://doi.org/10.7120/09627286.27.3.235>

(6) Yon L, Williams E, Harvey ND, Asher L. 2019. Development of a behavioural welfare assessment tool for routine use with captive elephants. *PLOS One*. 14: e0210783. <https://doi.org/10.1371/journal.pone.0210783>

Underpinning grants:

G1. Developing behavioural indicators, as part of a wider set of indicators, to assess the welfare of elephants in UK zoos. Sponsor: DEFRA. 2013-2015. GBP55,186. PI: Dr Lisa Yon

4. Details of the impact

As of November 2020, 64 elephants are kept in captivity, across 15 facilities, within the UK and Republic of Ireland (ROI) (British and Irish Association of Zoos and Aquariums (BIAZA) Elephant Welfare Group (EWG), 2020). Elephants are an endangered species and captive facilities undertake a vital role in conservation of the species, education and raising public awareness of conservation efforts. Within the UK, Government concerns about captive elephant welfare has put their future in UK zoos at great risk. Research undertaken by Dr Yon has informed captive elephant welfare policy and practices changes within the UK and ROI and led to improvements in elephant welfare.

Impact on UK and ROI policy: Implementation of revised guidelines and adoption of new welfare assessment tool

The research and evidence-based recommendations made by Dr Yon to the Department for Environment, Food and Rural Affairs (DEFRA) (2), for changes to the UK Government's Secretary of State's Standards of Modern Zoo Practice (SSSMZP) guidelines on keeping elephants, were released to UK zoos in late 2014 and fed directly into the UK Government's five-year review of elephant welfare. **These recommendations 'directly and substantially influenced' evidence-based changes to the SSSMZP (a).** The majority (70%) of the recommendations made to DEFRA (2) were incorporated into the updated UK SSSMZP guidelines, published in June 2017 (b,c). The recommendations were adopted in their entirety by the ROI and included in the 2016 Irish Government's Standards of Modern Zoo Practice (d). The current and former Chairs of the BIAZA EWG stated that '**These standards have had more of an impact on elephant welfare improvements than any other document in the last 40 years**' (e).

The Elephant Behavioural Welfare Assessment Tool (EBWAT) devised by Dr Yon was rolled out at the end of 2014, and in 2015 BIAZA's EWG advised all UK and Irish zoos to commence using the new EBWAT with their elephants. **Since 2017, use of the EBWAT became compulsory for all zoos as part of the UK Government's updated SSSMZP guidelines**, which state that '*The individual behaviour of elephants must be continually monitored and assessed, (including overnight behaviours) using welfare monitoring tools produced by Defra/ZEC-endorsed elephant management groups*' (b, pg. 7). Information provided through widespread use of the EBWAT in UK zoos has allowed zookeepers and researchers to further understand the welfare of captive elephants, has informed management and husbandry changes (described below) and has provided crucial data to inform future Government policy. Dr Yon and her team have led the collection and analysis of EBWAT data and the write-up of the BIAZA EWG's Ten-Year Report to the UK Government (completed late 2020, submitted early 2021). The Ten-Year Report will inform the UK Government on progress made by zoos on husbandry changes and improvements to elephant welfare, and will provide the evidence base on which subsequent Government decisions will be taken on whether UK zoos should continue to hold elephants. The Veterinary Adviser to the Animal Welfare Policy team in DEFRA, and DEFRA representative member of the EWG, confirmed that '**Dr Yon's collaboration and support for this work has been essential in providing key evidence for this policy area**' (a).

Improved awareness of welfare issues and implementation of changes to UK zoo practices

Since 2015, widespread implementation by UK zoos of the recommendations made by Dr Yon in the DEFRA report (2), alongside the updated UK SSSMZP guidelines and the mandated EBWAT, has **resulted in an improved awareness of behavioural and welfare issues in captive elephant collections and led to changes in the care, management, husbandry, feeding practices, and housing of UK zoo elephants** (detailed below).

In line with Dr Yon's recommendations (2) on elephant enclosure sizes and use of sand or an alternative soft substrate (reflected in the revised UK SSSMZP guidelines (b, pg. 5)), of the 12

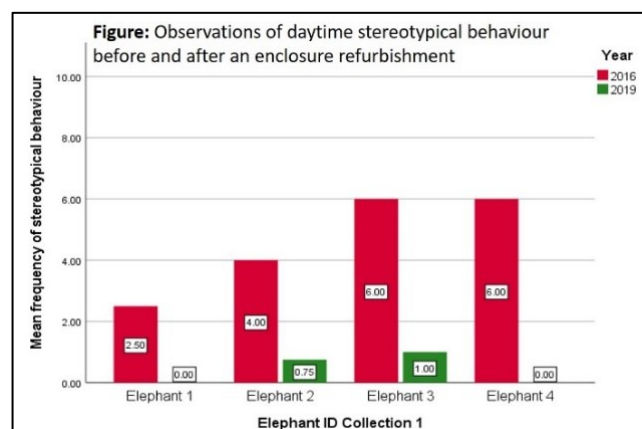
collections that held elephants both in 2014 and 2020, 7 (58%) had increased the size of the indoor and/or outdoor enclosure by 2020 (f, pg. 6). Meanwhile the use of sand as a soft substrate within the indoor enclosure used by elephants at night increased from 38% to 77% of zoos between 2014 and 2020 (f, pg. 6).

To date, 475 entries for 65 elephants have been completed using the EBWAT, representing all 15 UK elephant holding zoos (which kept elephants between 2015 and 2019) utilising the tool to monitor elephant welfare (f, pg. 8). Many keepers have reported that they have used the results from the EBWAT to identify areas of welfare concern in their elephants, and to track behaviour over time, which they otherwise wouldn't have time to observe. A number have indicated that they **use results from the EBWAT to make decisions about any changes they need to make to their management and husbandry practices for their elephants** (f, pg. 9, g). Feedback collected indicated that the tool *'can make any problems clear and the improvements you will see throughout the EBWAT'* and that it has benefitted their work by *'identifying trends in behaviour'* (f, pg. 9). Furthermore, keepers are able to *'improve enrichment or out of enclosure time based on behavioural issues'* observed using the EBWAT, and are therefore better able to respond to their elephants' needs (f, pg. 9).

Dr Yon's research, the resulting SSSZMP guidelines revisions and the EBWAT, have also influenced key decision-making by zoos on keeping elephants. For example, it **'directly informed changes in elephant management at Twycross Zoo resulting in substantial improvements to elephant welfare'** (g). The results from the EBWAT were *'used to inform the decision by Twycross Zoo to ultimately stop keeping elephants, and in 2018, they were sent to another zoo in the UK which we felt could provide a better positive welfare experience'*, where their long-term management and welfare, at Blackpool Zoo, has been substantially improved (g). As the former head elephant keeper (2013-2020) at Blackpool Zoo attests, the EBWAT permitted them to *'pick up significant changes in the welfare of individuals'* and *'also highlighted areas for improvement'* (g). Furthermore, **'the significance of the EBWATs importance in the management of elephants within captivity, by providing a robust tool in which to record and track progress, has been key to improvements in animal welfare'** (g).

Impacts on elephant welfare: Indications of improvement in UK zoo elephant welfare

The improved awareness of behavioural and welfare issues in captive elephant collections and the changes made to UK zoo elephant management and care, as detailed above, have **resulted in demonstrable improvements to elephant welfare**, as evidenced by data collected using the EBWAT across all elephants in the UK (f). Between 2015 and 2019, **fewer elephants have been observed displaying stereotypical behaviours** (an abnormal behaviour, these are a negative welfare indicator) during the day or at night, while positive affiliative social behaviour between elephants has remained stable throughout this period, indicating that changes made have impacted positively on elephant wellbeing (f, pg. 8). For example, one case study on a collection with four elephants showed a reduction in the occurrence of daytime stereotypical behaviour between 2016 and 2019, following an enclosure refurbishment (see graph right; f, pg. 17). Changes made to elephant enclosures, in line with the recommendations made by Dr Yon and her team on enclosure size and substrate use, have also led to a **steady improvement in elephant foot health**, with only 10% of elephants reported as suffering from 'severe' foot health issues in 2019, compared to 24% in 2015 and 52% as initially recorded in 2008 (f, pg. 16). Increases in enclosure size (as reported above) have also been associated with a reduction in stereotypical behaviour observed (f, pg. 12).



The current and former Chair of the BIAZA EWG confirmed that **'Dr Yon's contribution as Head of the Behaviour subgroup of the EWG has been integral to the development of welfare markers and improvements in elephant welfare in the UK'** (e).

International impacts: Changes to captive elephant management policies and practices beyond the UK

As a result of her research on elephant behaviour and welfare and her key role in reforming the UK SSSMZP guidelines, Dr Yon has been invited by several international organisations to provide expert advice and guidance on elephant welfare issues (h). She is currently **advising numerous elephant-holding facilities around the world (in S.E Asia, USA, and southern Africa) on elephant welfare and management issues and the use of the EBWAT (h-j)**. Dr Yon's recommendations and collaboration with these facilities has resulted in changes to elephant management and subsequent improvements to elephant welfare.

For example, in June 2017, Dr Yon organised and delivered an elephant welfare workshop in Chiang Rai, Thailand in collaboration with colleagues from the non-profit organisation Shape of Enrichment, the Singapore Zoo and the Golden Triangle Asian Elephant Foundation. This was delivered to 19 people (participants) representing 11 facilities and institutions from across Thailand and Myanmar and has subsequently led to changes to elephant husbandry by Elephant Valley Thailand in their facilities in Thailand and Cambodia (h, pg. 3,10).

At the [Barumon Nagari Wildlife Sanctuary in north Sumatra, Indonesia](#), home to 15 Critically Endangered Sumatran elephants, Dr Yon has worked with the facility since 2019 to introduce the EBWAT tool to **'assess the welfare of our elephants and make key changes to their management'** (i). The resulting management changes, based on *'recommendations made by Dr Yon from her research and work on the SSSZMP guidelines'* included improved access to water, the provision of sand substrate for lying rest, and additional social contact, **leading to a 'sustained impact on the Barumon Nagari Wildlife Sanctuary'** (i).

Since March 2019, Dr Yon has worked with a consortium of 11 elephant welfare facilities across southern Africa to develop welfare guidelines for these facilities and provide training and support to the owners and caretakers of the elephants. **'Dr Yon's research on Elephant Welfare and her work on the UK's SSSMZP guidelines have directly informed the development of the "Guidelines for Welfare & Management of Elephants in Human Care" which will form elephant welfare standards for a consortium of facilities across Zimbabwe, Zambia, and South Africa'** (j). These guidelines (finalised in December 2020) and the research-based recommendations made by Dr Yon have already been implemented at the Jafuta Reserve, where changes made to the care of their elephants have led to *'less stereotypical behaviours', 'more investigative behaviours', 'more affiliative behaviours', 'more lying rest'* and a general improvement to the welfare of their elephants (j). **Dr Yon's expert advice and research 'has directly informed the changes made to the way captive elephants are managed in the region, leading to significant welfare improvements'** (j).

5. Sources to corroborate the impact

- (a) Letter of support from the Veterinary Adviser to the Animal Welfare Policy team in the Department for Environment, Food and Rural Affairs (DEFRA)
- (b) [Secretary of State's Standards of Modern Zoo Practice \(SSSMZP\), Appendix 8 – Specialist exhibits, Elephants \(June 2017\)](#). DEFRA, UK. [PDF]
- (c) Extract from (2) indicating which recommendations were incorporated into the SSSMZP (b)
- (d) [Irish Standards of Modern Zoo Practice \(2016\)](#). Appendix 9.8 Elephants (pg.62-68). [PDF]
- (e) Letter of support from the present and past Chairs of the British and Irish Association of Zoos and Aquariums (BIAZA) Elephant Welfare Group (EWG)
- (f) Report to the Chair of the BIAZA EWG, September 2020
- (g) Letters of support from the Chief Executive at Twycross Zoo and the Former Head Elephant Keeper at Blackpool Zoo
- (h) Communications to Dr Yon from international elephant facilities and report on Thailand workshop (June 2017) [PDF]
- (i) Letter of support from Head of Elephants at Barumon Nagari Wildlife Sanctuary, Indonesia
- (j) Letter of support from the Project Director for the Zambezi Elephant Welfare and Conservation Trust at the Jafuta Reserve, Zimbabwe.