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Paul Garside & Karen Bradford

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Paul Garside ¹ and Karen Bradford²

¹Kelvin Centre for Conservation and Cultural Heritage Research, Kelvin Hall, University of Glasgow, Glasgow G12 8QQ, UK; ²The British Library, 96 Euston Road, London NW1 2DB, UK

Revising and developing the environmental policy at the British Library

Abstract

To preserve their collections, heritage institutions must understand and mitigate causes of damage, including environmental factors. Historically at the British Library this was addressed by policies developed over decades—frequently without overarching guidance—and in response to changing requirements. As a result, these policies were often disjointed, complex and unrepresentative of current practice. This article addresses the review, revision and application of policy. This is informed by a focus on collection needs that incorporate human, operational and practical requirements; the pragmatic understanding of contributory issues; and sufficient flexibility to encourage engagement and support Library activities without jeopardising collection safety. The revised policy has afforded a variety of benefits, not least that it is a single, concise document. It provides explicit reference to material types and vulnerabilities, and the requirements of operational activities, emphasising preventive conservation concerns. It is accessible to other stakeholders, encouraging effective collaboration and leading to achievable outcomes, benefitting the institution as a whole. As such it has strengthened the role of preventive conservation within the Library, and provided a solid and adaptable basis for future work.

Keywords

environment; environmental policy; environmental parameters; documentation; collection care; preventive conservation

Introduction

To adequately care for their collections, heritage institutions must understand and mitigate the impact of agents that cause deterioration, including environmental factors such as temperature, humidity, light and UV.¹ At the British Library (BL), as with many similar institutions, these issues have historically been addressed by policies that have been developed gradually over decades, derived from a variety of different sources and in response to changing concerns and needs. As a result, these policies are often disjointed, complex to interpret and apply, and do not always incorporate the necessary range of materials, collection types, activities and stakeholders relevant to current circumstances and practice. This article addresses the way in which the BL's approach has been reviewed, revised and applied, in line with the institution's current requirements, and demonstrates one way in which such a process can successfully be achieved in a large and complex organisation with many competing needs.

One of the main driving forces behind this work was the creation of a framework addressing the British Library's specific environmental monitoring needs.² This required reference to guidance documents outlining current practice to explain the underlying decision-making, which in turn highlighted outdated information, inconsistent terminology and implicit assumptions in the existing documentation. Although prior to this

¹ Cf. Canadian Conservation Institute, 'Agents of Deterioration', <https://www.canada.ca/en/conservation-institute/services/agents-deterioration.html> (accessed 13 July 2022); and D. Alex Dawson, ed., *Benchmarks in Collection Care for Museum, Archives and Libraries (2.0): A Self-Assessment Checklist* (London: Museums, Libraries and Archives Council, 2011).

² Paul Garside, Karen Bradford, and Sarah Hamlyn, 'The Use of "Combined Reporting" to Support Preventive Conservation at the British Library', in *Transcending Boundaries: Integrated Approaches to Conservation. ICOM-CC 19th Triennial Conference Preprints*, ed. Janet Bridgland (Paris: ICOM-CC, 2021), 219, <https://www.icom-cc-public>

CONTACT Paul Garside (paul.garside.2@glasgow.ac.uk); Karen Bradford (karen.bradford@bl.uk)

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work the BL's ongoing environmental working practices had been collection-based, adaptable and pragmatic, incorporating factors such as seasonal drift and sustainability,³ this was not properly reflected in the documentation which still referred extensively to rigid standards and inflexible specifications. In some cases these were also ambiguous or contradictory, leading to potential confusion, misunderstanding and the acceptance or implementation of non-ideal conditions. Furthermore, it became apparent that the complex and piecemeal nature of the existing environmental policy at the British Library created a barrier when talking to other BL colleagues, especially those outside collection care areas.

Ultimately the need for a fully revised position paper on the state and requirements of environmental conditions, their application and maintenance at the BL became clear. It had to be accessible and present a common and comprehensible foundation on which productive discussion and collaboration with other colleagues could be built. In particular, it was desirable that the document should be grounded in what was achievable whilst pursuing collection care objectives. It should also avoid recommendations based around theoretically ideal but functionally unachievable specifications, such that it genuinely supported the operation of the Library in a way that achieved the best possible collection care outcomes; it should also be accessible to as wide a range of stakeholders as possible.

Revising the environmental policy in this way has afforded a variety of benefits: the policy is now represented as a single, concise, clear document. It provides explicit reference to different material types and vulnerabilities, and the requirements of different operational activities across the whole Library. This means that other stakeholders can more readily understand preventive conservation concerns, forming the basis of effective collaboration and ensuring that collection care aims can lead to achievable outcomes to the benefit of the institution as a whole.

Policy requirements

The following factors informed the development of the policy:

- 1 The policy needed to be expressed succinctly and in accessible language—providing that this would not be at the expense of clarity or content—to allow it to be understood by as wide as possible an audience of stakeholders (including collection care staff, the engineering department, the exhibitions team, the loans registry, curators and management).
 - a Roles and responsibilities were to be clearly stated. The specifications of the policy were to be principally focussed on collection needs, but also take into account requirements of staff and readers, Library operations, engineering practicalities, available facilities and energy efficiency.
- 2 The specifications would be based on a practical understanding of the contributory issues, rather than assumed ideals, and would take into account current standards and available literature.
- 3 Environmental parameters including temperature, relative humidity and light would be controlled in line with collection needs, and be expressed in the policy document in a consistent manner to ensure clarity.
 - a The policy needed to be adaptable and pragmatic, incorporating factors such as seasonal drift, sustainability and energy efficiency, while recognising not only that these requirements may change over time, but that as yet unforeseen issues may need to be included in future.

[ations-online.org/4457/The-use-of-combined-reporting-to-support-preventive-conservation-at-the-British-Library](https://www.ica-uk.org/4457/The-use-of-combined-reporting-to-support-preventive-conservation-at-the-British-Library) (accessed 7 September 2022).

³ Paul Garside and Karen Bradford, 'Reassessing the Environmental Requirements of the British Library', *Papyrus (IAMFA) Summer Issue* (2016): 34–5.

- 4 Environmental conditions were to be considered in relation to the nature of operational activities, broadly categorised as long-, medium- or short-term.
- a 'Long-term activities' would be over 6 months—effectively in perpetuity, in line with the BL's duty for the majority of its collections—and principally relate to storage such that environmental conditions should be optimised according to the nature of the collection to ensure longevity.
 - b 'Medium-term activities' would take up to 6 months, including most exhibitions and loans, cataloguing and some conservation work; this category would also include some adaptability to address the needs of longer loans.
 - c 'Short-term activities' would take up to 1 week, and include most operational activities, such as access in the reading rooms, use by BL staff, digitisation, photography, transport and some conservation work.

For short- and medium-term activities, some flexibility in conditions would be allowed, to accommodate human comfort and the nature of the working areas within the Library, providing conditions and exposure periods are still appropriately controlled to minimise risks and the inherent vulnerabilities of different material types are taken into account.

Policy development

Based on these concerns, issues and requirements, the revised policy was developed to incorporate the following considerations.

To ensure clarity, environmental parameters, particularly around temperature (T) and relative humidity (RH), need to be expressed in a consistent manner. These parameters represent the target ranges within which temperature and RH will ideally fall; they are set with the understanding that it is impossible to measure these conditions with complete rigour due to drift in sensor accuracy after calibration, the size and configuration of the spaces being monitored, the rate of response of the environmental plant machinery, and so on. Parameters are therefore specified with the pragmatic and practical understanding of these limitations, and are to be achieved for as great a proportion of the time as is realisable with the operation of the plant. One of the methods by which the performance of environmental controls is assessed is the proportion of time within which conditions fall within these parameter ranges.⁴

It was decided that the most appropriate method of specifying parameters was to express the desired temperature and humidity as a range (e.g. 18–20°C) rather than a set point with variation (e.g. 19±1°C). This was due to the recognition that use of the latter system tended to result in excessive focus on achieving the set point itself to the detriment of stability, rather than finding a point within the specified range that could be achieved with minimal fluctuations. Furthermore, it was found to be beneficial to specify desired parameters using a different system—a range—to that employed by the BL's engineering department for controlling plant operation—i.e. a set point with variation. This gave greater freedom to the engineers to decide how best to achieve the conditions within the limits of the Building Energy Management System (BEMS), and prevented confusion between *acceptable* condition ranges and *specified control* of conditions, which had been an issue when conditions were both stipulated and controlled using the same system. This, in turn, led to a more productive and collaborative working relationship between preventive conservation and engineering staff. Allowable fluctuations in

⁴ See Garside, Bradford, and Hamlyn, 'The Use of "Combined Reporting" to Support Preventive Conservation at the British Library'.

conditions would be expressed as the maximum permitted change within a 24-hour period; more involved methods of assessing the extent of fluctuations were initially considered, but were found to be too complex to readily implement and of limited additional benefit.

Conditions are to be monitored independently by the Conservation Department⁵ and the Engineering Department, the former via a system of telemetric sensors, the latter via the inbuilt BEMS. There are approximately 150 telemetric temperature and RH sensors, the majority of which are placed in specific locations, with some used additionally when required to address the particular needs of situations such as displays, public events, maintenance work or other incidents necessitating specific monitoring; these systems are calibrated annually. There are approximately 500 BEMS sensors across both sites, with fixed locations to monitor heating, ventilation, air conditioning (HVAC), lighting and other energy-consuming systems. These are calibrated every 6 months.

In order to interpret and compare these data appropriately, it is necessary to understand the accuracy of the systems and any systematic differences between them: the telemetric sensors work to an accuracy of $\pm 1^\circ\text{C}$ and $\pm 3\%RH$, whereas the BEMS sensors have $\pm 0.2^\circ\text{C}$ and $\pm 2\%RH$, and on average the telemetric sensors measure 1°C and $3\%RH$ higher than those of the BEMS system. Figure 1 presents a comparison between BEMS and telemetric sensor data from a single location in the BL Conservation Centre and demonstrates the broad agreement between the two systems, albeit with some apparent lag and variability. In addition to the direct use of these data from both systems to assess current conditions, the data will also be used to evidence and inform decision-making, particularly in relation to the improvement of storage conditions, optimisation of environmental parameters, and adjustment of the operation of plant in order to permit greater energy efficiency.

Several fundamental considerations were addressed explicitly in the documentation, as detailed below. Although many of these are second nature to experienced collection care practitioners, it became evident that staff across a much wider range of areas within the Library, with varying levels of expertise and experience, were making use of the guide-

⁵ See Garside, Bradford, and Hamlyn, 'The Use of "Combined Reporting" to Support Preventive Conservation at the British Library'.

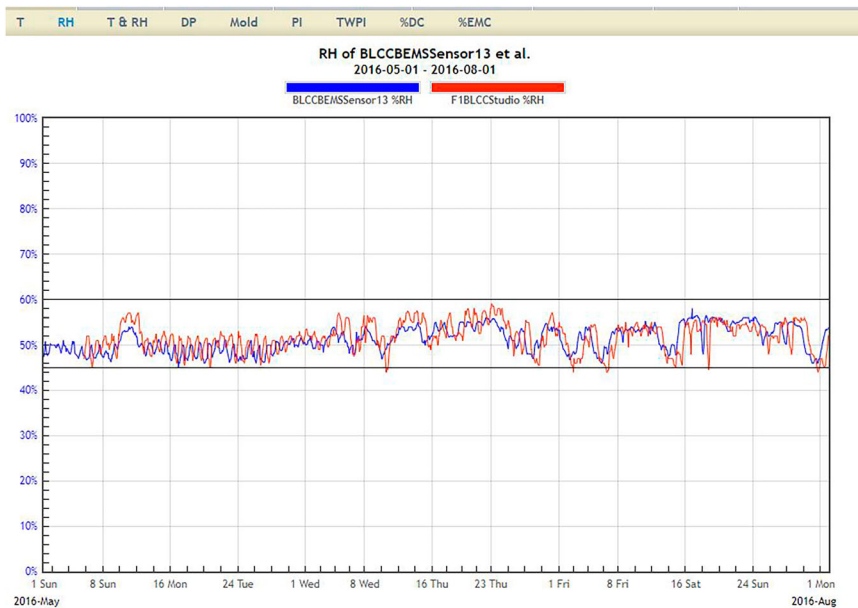


Fig. 1 A comparison of data from telemetric sensors and BEMS sensors in a single location.

lines to support decision-making, and that these staff did not always have sufficient understanding. Ensuring that these factors were unambiguously stated and addressed helped to ensure clarity for all users, and make it clear why, for example, conditions might occasionally be allowed to go outside normally recommended ranges to bring problematic environmental situations under control or to achieve stability.

In general, and for the majority of types of collection material, temperature and relative humidity should be limited—below 25°C and 65%RH—to avoid irreversible changes through accelerated chemical damage or the promotion of mould growth. As fluctuating conditions are more harmful than stable ones, these should be avoided or minimised, even if this means allowing conditions that fall slightly outside the desired parameters, due to operational requirements and the nature of air-handling systems.⁶ In general, both fluctuations and extremes in RH pose a greater threat to collections than those of temperature therefore, if necessary, it may be appropriate to exceed the given temperature parameter to control and stabilise RH. This is because temperature and RH are interlinked: within an unbuffered environment a 1°C rise will typically lead to a fall of 3%RH;⁷ in enclosed environments, or in the presence of buffering materials, including other collection items, these parameters still have a dependency but the relationship is not so clearly defined. It was also noted that items are most vulnerable when in use, on display or during transit, and are especially susceptible to RH changes. Conversely, minor RH fluctuations in storage areas can be comfortably accommodated, especially when items are densely packed on shelves or in storage boxes, as it had been demonstrated that such materials were largely insensitive to changes of this kind.⁸

Where required, tighter RH conditions should be achieved through passive control in display cases, microclimate enclosures in storage areas,⁹ and sensible grouping of materials requiring particular conditions (such as philatelic and photographic items) in designated specialised storage areas. Gradual, limited changes in RH and temperature will also be considered to accommodate the seasonal drift apparent in external conditions, thus allowing a more effective, reliable and efficient operation of the BL's environmental plant, provided such activity will not have an adverse effect on the collection. In general, passive environmental control is preferred for display cases rather than active environmental control. At the time of writing, within the majority of BL locations, passive control provides a demonstrably more stable environment, particularly in terms of RH, and is also more sustainable; it can be supported and adjusted by the use of buffers such as silica gel. This has been evidenced by the BL's historic monitoring data from passive and actively controlled showcases as well as in cupboards and enclosures when compared with large storage areas; these data have also been augmented through experiments assessing the environmental stability of shelved books.¹⁰ Figure 2 demonstrates the significant humidity buffering effect of an enclosed storage cupboard compared to the wider storage space in which it is located, even when the temperatures of the two spaces are in close accordance. In general, to ensure display cases offer the greatest protection to their contents they should be maintained to the BS EN 15999-1:2014 standard for the design of showcases for cultural heritage in terms of the quality of seals, levels of air-exchange, and so on.¹¹ Plant and support equipment must be similarly maintained.

Light levels should also be limited to avoid damage to light-sensitive materials, although higher levels of illumination may be acceptable for short-term activities. As ultraviolet radiation is particularly damaging, it should always be excluded through the use of UV-free or UV-shielded lights and glazing designed to block UV light. Direct sunlight should not be allowed to fall on collection items.

⁶ British Standard Institution, BS 4971:2017: Conservation and Care of Archive Library Collections (London: The British Standards Institution, 2017): 5.1.2, Environmental stability.

⁷ Cf. BS 4971:2017: 5.1.3, Temperature and RH for traditional mixed archive collections; and BS 4971:2017: Appendix A.3.

⁸ See, for example, Paul Garside and Barry Knight, 'The Behaviour of Books in Changing Environmental Conditions and the Implications for Collection Storage', in *Proceedings of the ICOM Committee for Conservation, Preprints of the 16th Triennial Conference (ICOM-CC, 2011)*, 359, <https://www.icom-cc-publications-online.org/1181/The-Behaviour-of-Books-in-Changing-Environmental-Conditions-and-the-Implications-for-Collection-Storage> (accessed 7 September 2022).

⁹ Cf. for example, Paul Garside and Lesley Hanson, 'A Systematic Approach to Selecting Inexpensive Conservation Storage Solutions', *Journal of Conservation and Museum Studies* 9 (2011): 4–10.

¹⁰ Garside and Knight, 'The Behaviour of Books in Changing Environmental Conditions'.

¹¹ British Standard Institution, BS EN 15999-1:2014: Conservation of Cultural Heritage—Guidelines for Design of Showcases for Exhibition and Preservation of Objects—Part 1: General Requirements (London: The British Standards Institution, 2014); British Standard Institution, BS EN 15999-1:2014: Conservation of Cultural Heri-

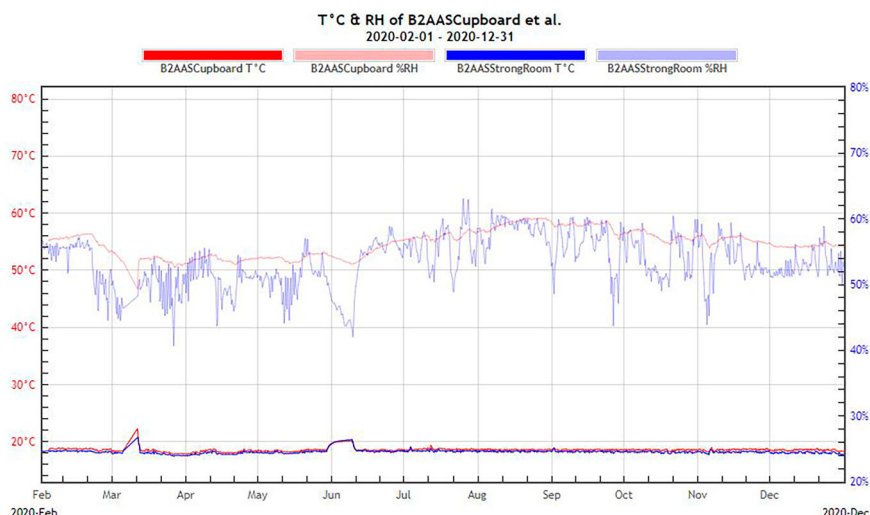


Fig. 2 A comparison of T and RH data from an enclosed storage cupboard with that of the wider storage space in which it is located.

tage—Guidelines for Design of Showcases for Exhibition and Preservation of Objects—Part 2: Technical Requirements (London: The British Standards Institution, 2014).

Material sensitivities

To ensure that the collection is adequately protected, it is necessary to understand the particular vulnerabilities of the various objects and materials it contains. To this end, 27 categories of material types were identified, as outlined in Table 1. These reflect the particular composition of the BL’s collection and

Table 1 Material sensitivities and appropriate environmental conditions.

Class	Category	Temperature/°C		RH/%		Light Sensitivity
		Range	(Sensitivity)	Range	(Sensitivity)	
Paper, Parchment & Prints	Parchment	13–20	(moderate)	45–60	(moderate)	moderate
	Paper with Iron Gall Ink	13–20	(moderate)	45–60	(moderate)	moderate
	Paper, Printed, B&W (Historic)	13–20	(moderate)	45–60	(moderate)	low
	Paper, Printed, B&W (Modern)	13–20	(moderate)	45–60	(low)	low
	Paper, Printed, Colour	13–20	(moderate)	45–60	(low)	moderate
	Paper with Other Media	5–20	(moderate)	45–60	(moderate)	high
	Newspapers	5–18	(moderate)	30–50	(moderate)	low
	Philatelic	13–20	(moderate)	55–60	(high)	moderate
	Early Copying Techniques	5–18	(moderate)	25–30	(moderate)	high
	Papyrus & Other Plant Material	13–20	(moderate)	45–60	(moderate)	moderate
Polymers, Films & Photographs	Plastics: Malignant	–10–5	(high)	30–50	(moderate)	moderate
	Plastics: Non-Malignant	10–20	(moderate)	30–50	(moderate)	moderate
	Wax & Wax-Like Materials	13–20	(high)	35–60	(low)	low
	Film, Negatives, Slides: Polyester	5–18	(moderate)	30–50	(low)	moderate
	Film, Negatives, Slides: Acetate	0–10	(high)	30–50	(high)	high
	Film, Negatives, Slides: Nitrate	–10–5	(high)	30–50	(high)	high
	Photographs: B&W Prints	5–18	(moderate)	30–50	(moderate)	high
	Photographs: Colour Prints	5–18	(high)	30–50	(moderate)	high
Other Materials	Glass Photos, Negatives, Slides	5–18	(moderate)	30–40	(high)	high
	Textiles, Leather, Hair	13–20	(moderate)	45–60	(low)	moderate
	Ceramics (Glazed)	10–25	(low)	35–60	(low)	low
	Clay & Plaster (Unglazed)	10–25	(low)	35–60	(moderate)	low
	Metals: Ferrous	10–25	(low)	15–30	(high)	low
	Metals: Non-Ferrous	10–25	(low)	35–60	(moderate)	low
	Bone & Ivory	5–18	(moderate)	50–55	(high)	moderate
	Wood Artefacts	13–20	(moderate)	45–60	(moderate)	moderate
Mixed Composition	Stone, Minerals, Glass	10–25	(low)	35–60	(low)	low
	Electronic, Electrical, Mechanical	5–20	(moderate)	35–60	(moderate)	low
	Magnetic Media	5–18	(moderate)	30–50	(high)	low
	Paintings	5–20	(moderate)	45–60	(moderate)	moderate
	Mixed Media Artefacts	*		*		*

Note: * Consult Preventive Conservation.

therefore have an emphasis on paper and parchment, as well as film and recording media; within this schema, materials such as gramophone records and optical media are treated as ‘wax and wax-like materials’ and ‘non-malignant plastics’, as appropriate. The tabulation of the Library’s materials was facilitated by a collection material survey carried out in 2015 which enabled the approximate distribution of material types within the collection as a whole, and more specifically within particular collection areas, to be identified. The listed parameters for RH, temperature and light are based around reported recommendations for the different material types and the capacity of the Library to reliably maintain specific environments within collection storage areas. As a result, for example, the temperature range for ‘newspapers’ has a relatively low minimum temperature, reflecting the operation of the bespoke Newspaper Storage Building, which houses the majority of this material within the BL’s collection. Furthermore, it is recognised that these environmental ranges (especially temperature) may need to be revised in future, to pragmatically address the additional burdens of climate change and energy costs, as well as an increasing institution-wide emphasis on sustainability.

Based on the available literature, appropriate temperature and relative humidity ranges for each material type were identified, as well as a sensitivity level—rated as high, moderate or low—to reflect the rapidity and extent of problems that are likely to arise if the material was exposed to conditions outside its optimal ranges.¹² A similar sensitivity rating was also determined for light exposure.¹³

¹² This work was originally developed under the then current British Standard, PAS 198:2012: Specification for Managing Environmental Conditions for Cultural Collections (London: The British Standards Institution, 2012). For library and archive collections, this has now been superseded by BS 4971:2017: Conservation and Care of Archive and Library Collections (London: The British Standards Institution, 2017). More broadly, for a wider range of museum objects and materials, BS EN 16893:2018: Conservation of Cultural Heritage—Specifications for Location, Construction and Modification of Buildings or Rooms Intended for the Storage or Use of Heritage Collections (London: The British Standards Institution, 2017) is relevant.

¹³ Cf. for example, Stefan Michalski, ‘Agents of Deterioration: Light, Ultra-violet and Infrared’, Canadian Conservation Institute, <https://www.canada.ca/en/conservation-institute/services/agents-deterioration/light.html> (accessed 8 January 2022).

¹⁴ The British Library, ‘About Us’, The British Library, <https://www.bl.uk/about-us>; The British Library: ‘Our Vision’, <https://www.bl.uk/about-us/our-vision>; and The British Library: ‘Custodianship’, <https://www.bl.uk/about-us/our-vision/custodianship> (all accessed 26 November 2023).

Activities

The British Library has a working collection, meaning that the majority of the items are available to be called up to the on-site reading rooms for use by readers, as well as a wide range of other activities, such as exhibitions, loans, conservation work, digitisation and photography, cataloguing and use by staff.¹⁴ The previously existing environmental recommendations reflected the then desired storage conditions, but did not take into account the requirements of these other operational activities, when objects may encounter environments that vary from storage conditions due to a range of other factors, such as human comfort, characteristics of the buildings or operational necessities such as, for example, sufficient lighting to allow conservation work to be carried out or to enable digitisation. This also potentially led to confusion when dealing with other stakeholders and users, for whom it may not have been obvious why activities involving collection items were deemed appropriate in areas which did not conform to the specified storage conditions such as the conservation studios. Figure 3 shows the way in which environmental parameters within differing locations in the Library may vary over time, and in particular that within operations areas such as the conservation studio. These parameters may exceed nominal specifications—especially temperature—due to factors like staff activity, staff comfort and the nature of the spaces. The revised guidance explicitly addresses this for areas in which collection items will only be exposed for limited periods of time to allow necessary collection care activities to take place.

To take these factors into account and incorporate them into the revised policy, use of collection items was divided into short-, medium- and long-term activities, as outlined in Table 2. ‘Short-term activities’ were deemed to be those typically lasting less than a week (and often less than a day); in this situation, it was felt that additional latitude could be allowed in environmental conditions, providing these did not actively endanger collection items, to allow operational processes to be carried out effectively. ‘Medium-term activities’ were defined as those lasting not more than 6

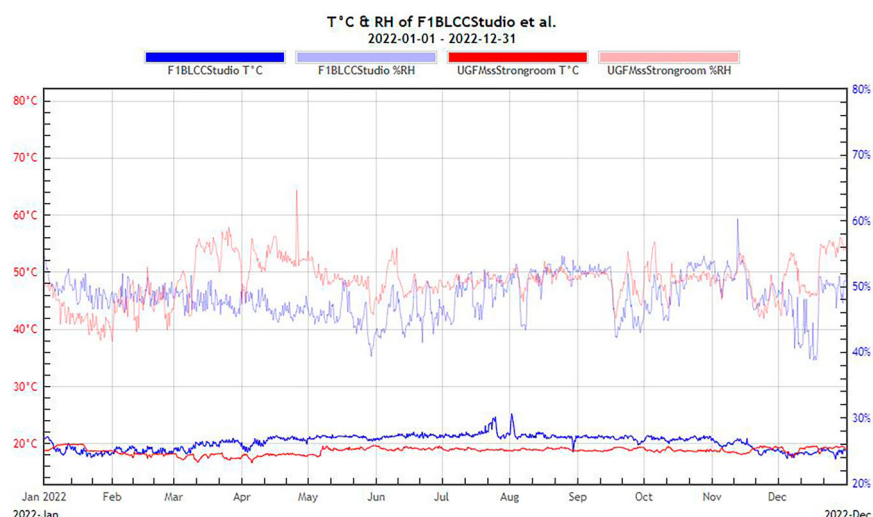


Fig. 3 A comparison of variation in T and RH data between operational and storage areas, highlighting the greater flexibility permitted in the former.

months, which would cover the majority of exhibitions and loans, as well as work such as more prolonged conservation treatments. 'Long-term activities' covered operational processes which continued over more extended periods, and as these were principally related to collection storage, these were effectively deemed as being in perpetuity. This schema was developed based on the requirements of existing BL activities, and with the intention that it would be sufficiently flexible to incorporate new and emerging activities in the future.

The environmental policy was originally intended primarily for internal use, but discussions with the BL's Loans Registry revealed that it would also be a useful decision-making and explanatory tool for their work, especially when working with external partners. However, this brought to light a shortcoming in the initial designation of timescales, particularly with the definition of 'medium-term' activities as being 'up to 6 months' as many loans, especially the increasingly popular touring exhibitions which are hosted sequentially by several institutions, extend to longer periods than 6 months. However, it would be inappropriate to categorise them as a 'long-term activity' as this is intended principally for permanent storage. A possible method of resolving this was to introduce a fourth category of activity, but after consideration it was felt that this created unnecessary complexity and would potentially lead to confusion. Ultimately it was decided that a certain amount of flexibility would be permitted in the definition of 'medium-term activities', allowing them to encompass extended loans of potentially over a year or more, but only after explicit consultation with, and agreement by, curators and collection care staff. Therefore, in the majority of cases, 'medium-term activities' would remain as being up to 6 months.

Acceptable parameter ranges

In developing the policy this way it became possible to consider the impact of different types of activity on the previously determined material stability and sensitivity ratings, allowing for appropriate environmental controls in different situations to be determined.

As noted earlier, of the environmental factors, relative humidity and its stability were deemed as being of the greatest concern to the preservation

Table 2 Permitted variation in environmental parameters for short-, medium- and long-term activities.

Time scale	Period	Activities	T & RH	Light
Short term	Up to 1 week	(Most operational activities) Access in reading rooms	Some variation permitted to allow operational activities.	Reasonable lighting to allow operational activities is permitted.
		Use by BL staff Digitisation and photography Some conservation work Transport	Items should be closed, boxed, etc., when not in use.	Items should be closed, boxed, etc., when not in use.
Medium term	Up to 6 months*	Most exhibitions Most loans Some conservation work Most cataloguing	Stability required, with minor variation permitted to allow operational activities. Temperature parameters may be extended slightly.	Typically no more than 50 lux should be allowed (this may be time-averaged if appropriate), unless items are particularly stable. No direct sunlight.
		Storage	Stability required. Parameters should be closely controlled to material requirements. Some seasonal variation may occur. High-density storage preferred.	Storage areas should be dark when not in use by staff. No direct sunlight.
Long term	Longer than 6 months†			

Notes: * This may be extended up to 3 years, with the express permission of the relevant curator and in consultation with other relevant members of staff (which may include the Loans Registry, Preventive Conservation and Exhibitions).

† Or periods longer than medium term, if an extended medium-term period is agreed.

15 Cf. British Standard Institution, BS 4971:2017: Conservation & Care of Archive & Library Collections: Appendix A; Sarah Staniforth, Bob Hayes, and Linda Bullock, 'Appropriate Technologies for Relative Humidity Control for Museum Collections Housed in Historic Buildings', in *Preventive Conservation Practice, Theory and Research*, ed. Ashok Roy and Perry Smith (London: International Institute for Conservation, 1994), 123–8; Sarah Staniforth, 'Conservation Heating to Slow Conservation: A Tale of the Appropriate Rather than the Ideal' (Experts' Roundtable on Sustainable Climate Management Strategies, April 2007, Tenerife, Spain), https://www.getty.edu/conservation/our_projects/science/climate/paper_staniforth.pdf (accessed 7 December 2023); Nigel Blades et al., 'Conservation Heating 24 Years On', *Studies in Conservation* 63, suppl. 1 (2018): 15–21; Tim Bowden, 'Sensible Heating—Balancing Energy Consumption, Comfort and Conservation', BuildingConservation.com (Cathedral Communications Ltd), <https://www.buildingconservation.com/articles/sensible-heating/sensible-heating.htm> (accessed 1 September 2022).

of the majority of the collection. Temperature, providing it was not markedly inappropriate, was not considered to be as great a problem and, as mentioned, permitting temperature to rise to control humidity was felt to be acceptable within reasonable limits.¹⁵ Furthermore, temperatures which fall below the recommended range were not considered to be a particular problem, given the nature of the collection, the characteristics of the BL's buildings, and the typical climate in the UK as it was considered, for example, very unlikely that items would encounter conditions of sufficiently low temperature to embrittle or otherwise damage them. The acceptable ranges set out in Table 1 were taken as a starting point, and applied as the required conditions for long-term activities, in effect, for storage in perpetuity; it was also assumed that storage areas should not typically be illuminated unless being accessed. This then enabled a set of guidelines to be developed to indicate the extent to which specified environmental conditions could be varied (Table 3), based on material types and sensitivities and activity periods:

Temperature: For shorter-term activities and less temperature-sensitive materials, the maximum permitted temperature could be increased.

Relative Humidity: For shorter-term activities and less humidity-sensitive materials, the extent of permissible humidity fluctuations in 24h could be increased, although the allowable range (maximum and minimum) would not be altered.

Light: For shorter-term activities and less light-sensitive materials, the light exposure of items could be increased.

This process lent itself to implementation in a simple tool created in *Microsoft Excel* to enable the appropriate conditions for a particular material within a specified activity period to be readily determined (Fig. 4).

Documentation

Ultimately, it was possible to state the environmental policy requirements in a document expressed on two sides of A4 paper, plus three further pages of tables setting out material sensitivities (see Table 1), environ-

Table 3 Impact of sensitivities on allowable T, RH and light levels, for short-, medium- and long-term activities.

Activity		Sensitivities		
		Low	Moderate	High
Short	T:	+4 °C	+4 °C	+2 °C
	RH:	15%/24h	10%/24h	5%/24h
	Light:	unrestricted	500 lux	50 lux
Medium	T:	+4 °C	+2 °C	+0 °C
	RH:	10%/24h	5%/24h	5%/24h
	Light:	500 lux	50 lux	50 lux*
Long	T:	+0 °C	+0 °C	+0 °C
	RH:	10%/24h	5%/24h	5%/24h
	Light:	0 lux†	0 lux†	0 lux†

Notes: * Additional light protection should be provided, such as covers or screens, or light levels should be proportionately lower.

† Long-term storage should be effectively light free, with lighting only used for access or operational activities.

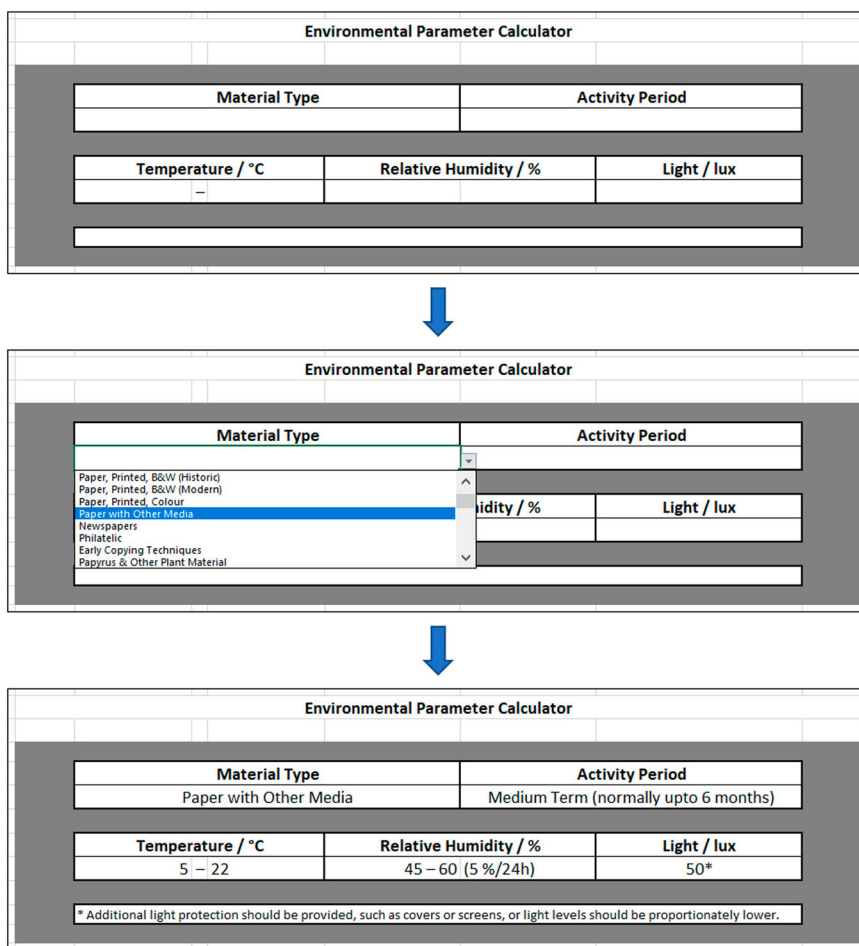


Fig. 4 Demonstration of the *Microsoft Excel* tool for calculating allowable environmental parameters, based on material type and length of proposed activity.

mental parameters for storage and operational locations across the Library sites, and the nature and impact of different types of activity (see [Tables 2](#) and [3](#)). The document was explicitly owned by the preventive conservation team within the Conservation Department, giving a clear point of contact in the event of queries or uncertainties. This ensured that necessary core

information could be found in a single succinct and easily accessible guidance document, contrasting with the previous situation in which information was scattered across several guidelines, whose origins, scope, intent and ownership were not always clear.

Implementation

The development of the documentation had immediate benefits in the conservation and collection care areas of the Library. It gave greater clarity to the scope and requirement of activities relating to the maintenance of the environment in all storage and operational areas, and enabled monitoring to be carried out and interpreted more accurately.¹⁶ It also helped to build on an already strong working relationship with the Engineering Department.

One of the first steps in implementing the policy was to ensure buy-in from other stakeholders and decision-makers. A series of awareness and discussion sessions were rolled out to colleagues in the exhibitions, loans, collection care and collection security departments to explain the revised policy document. This was designed to help ensure that the new guidance would be reflected in their related policies and procedures so as to ensure a clear and consistent approach across all departments. One aim was to make it clear that the new policy did not represent a fundamental alteration in the consideration, monitoring or maintenance of the environment in the institution but instead provided a clarification of the policy and its supporting documentation to aid in future decision-making and make a clear delineation of responsibilities. As a result, a number of 'quick wins' have been achieved, including ensuring that the revision was recognised and adopted which led to the updating of related documents used within collection care, as well as similar documents owned by other departments. It also provided clear routes of communication, as well as highlighting areas where the policy needed to be adapted, such as with the recommendations on extending the scope of 'medium-term activities' in specific situations.

By using this renewed documentation the Library's disaster preparedness guidance has also been updated to highlight the risk of damage to items because of a changing environment, with formal training being delivered to the Salvage Team. Exhibitions and Loans documents have been updated to reflect new parameters, and gaps in the information have been filled—such as explicit mention of lighting and UV requirements—which has improved communication with lenders and external partners, bringing consistency to the inward- and outward-facing aspects of the Library. Staff training on the use of collections, for both existing staff and new starters, uses the revised policy document to highlight the importance of returning items to storage as soon as practicable after use.

The new policy has also facilitated the revision and streamlining of the Library's 'Environmental Escalation Procedures' document, which is intended as an aid for decision-making and communication to address environmental concerns that may arise for items on exhibition or display.¹⁷ The original version of this document consisted of a seven-stage response plan with very tight parameter specifications and trigger levels to initiate the first response and subsequent escalation of stages; for example, the transition from stage 1 to stage 2 required a change (rise or fall) of 1°C in temperature and 2% in RH. This involved significant complexity, overly sensitive trigger events and an escalation process which could rapidly be superseded by events. As a result, it was frequently adapted or only partially applied on an ad hoc basis and existed more as a paper exercise for record-keeping than as a practical tool. As part of the revision of documentation, this was therefore adapted as a three-stage response which is only triggered when parameters fall

¹⁶ Garside, Bradford, and Hamlyn, 'The Use of "Combined Reporting" to Support Preventive Conservation at the British Library'.

¹⁷ The dedicated storage areas are known to be significantly more environmentally robust, and are buffered both by the structure of the buildings and the mass of objects held within them, so similar escalation procedures are not required in these locations, instead relying on adequate monitoring and staff response.

outside ranges and widening the stages to 2°C and 5% changes, thereby making it easier for the engineers to troubleshoot and escalate issues when they arise.

In addition to the immediate outcomes, a strategic plan for long-term aspirations is being developed at the Library and the revised policy will inform all future development and underpin sustainability initiatives in the process.¹⁸ Not all areas in the Library currently meet the guidance set out in the policy, but it will be used to justify and target investment in these areas. All decisions in relation to new buildings and maintenance will also reference this guidance and it will also be used to inform requirements for any services, development schemes or materials provided by external contractors. The new environmental policy is an evolving document under constant review and can be amended to reflect changes to activities or procedures, with input from other colleagues.

One important outcome of the revised documentation is that it has enabled informed and productive conversation with other departments and staffing within the Library when dealing with issues such as differing specified parameters in different locations across the sites. For example, concerns had previously been raised about the generally higher and less tightly controlled temperatures and humidities in the Library's conservation and digitisation areas, when compared to storage areas, as well as higher light levels, and the deleterious impact this may have on collection items used in those areas for operational purposes. The new guidance made it easier to explain the sensitivities of materials, the ranges of conditions which could be regarded as 'safe' for them, and the way in which this could further be understood in terms of lengths of exposure; with the specification of 'short-', 'medium-' and 'long-term activities', it is possible to demonstrate how exposure to slightly less strictly controlled conditions for an operational activity, such as conservation, has minimal impact on an object when compared to the much more tightly controlled conditions for permanent storage.

It has also proved invaluable as an aid for making sensible decisions, with 'buy-in' and agreement from other stakeholders, about the display of materials and objects in non-gallery and non-storage areas such as the front hall, and allowed informed discussions about appropriate selection of items, material sensitivities, acceptable exposure times, and so on.

Importantly this has developed from and supports the risk-management approach which now underpins much of collection care decision-making at the British Library, and provides clear and succinct guidance which can be understood and, if appropriate, applied within the wider context of the institution.

Conclusion

For an institution such as the British Library, robust collection care procedures, including the maintenance of suitable environmental conditions, are essential: this makes it possible to address the needs of a very large collection containing many items of great historic significance and representing a wide range of material types, as well as the requirement both to ensure the preservation of the collection and allow access to it. Although environmental provision at the BL had been routinely reviewed and adapted over the years in line with evolving best practice, the supporting documentation did not necessarily reflect this, leading to the potential for confusion and misunderstanding. The previously existing guidance documents had been compiled over the course of decades, and so reflected practice at different points in time, and in different collection areas; as a result, they were sometimes outdated, ambiguous or contradictory. Furthermore, it became apparent that different departments were not always referring to the same guidance, complicating discussions

¹⁸ Cf. The British Library, 'Transforming Boston Spa', <https://www.bl.uk/projects/boston-spa-plans> (accessed 31 August 2022); The British Library: 'Building the Future', <https://www.bl.uk/projects/building-the-future>; The British Library: 'Major Step Closer to British Library Site at Temple Works in Leeds', <https://www.bl.uk/press-releases/2021/july/temple-works>; Museums+Heritage Advisor, 'Repairs to Begin at Egyptian-inspired Building and Potential British Library Site', <https://advisor.museumsandheritage.com/news/repairs-begin-egyptian-inspired-building-potential-british-library-site/> (all accessed 5 September 2022).

on exhibitions, loans and the use of plant. Therefore, it became necessary to fully revise this support material which, in doing so, presented an opportunity to ensure clarity over the current environmental requirements of the collection, including the specific needs of particular material types, the use of terminology and the methods of specifying parameters. The ways in which optimal conditions could be achieved and the circumstances under which greater flexibility could be allowed needed to also take into account public access, human requirements and operational needs. Importantly, unlike the earlier available guidelines, the revised document fully references the sources which have been used to develop it, and has an accessible, modular structure; this ensures that as far as possible it is 'future proof', with the transparency and flexibility to be adapted to emerging—and perhaps unforeseen—needs, without requiring complete re-writing.

Overall, the revision and development of the environmental policy at the British Library, and its expression as a single, concise document, has not only clarified the collection care requirements of the institution, but has also enhanced working relationships with colleagues and other stakeholders by promoting and supporting communication, collaboration and buy-in. As such it has strengthened the role of preventive conservation within the Library, and provided a solid and adaptable basis for future work.

ORCID

Paul Garside  <http://orcid.org/0000-0002-0981-8816>

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Résumé

« Réviser et développer la politique environnementale de la British Library »

Pour préserver leurs collections, les institutions patrimoniales doivent comprendre et atténuer les causes des dommages, y compris les facteurs environnementaux. Historiquement, à la British Library, ce problème était géré par des politiques élaborées au fil des décennies—souvent sans orientation générale—et en réponse à des exigences changeantes. En conséquence, ces politiques étaient souvent décousues, complexes et peu représentatives des pratiques actuelles. Cet article traite de l'examen, de la révision et de l'application de la politique. Ceci s'appuie sur une réflexion sur les besoins en matière de collecte en intégrant les exigences humaines, opérationnelles et pratiques ; la compréhension pragmatique des enjeux contributifs ; et une flexibilité suffisante pour encourager l'engagement et le soutien aux activités de la bibliothèque sans compromettre la sécurité des collections. La politique révisée présente de nombreux avantages, notamment le fait qu'il s'agit d'un document unique et concis. Il fournit une référence explicite aux types de matériaux et à leurs vulnérabilités, ainsi qu'aux exigences des activités opérationnelles, en mettant l'accent sur les préoccupations de conservation préventive. Il est accessible aux autres parties prenantes, encourageant une collaboration efficace et conduisant à des résultats réalisables, bénéficiant à l'institution dans son ensemble. En tant que tel, il a renforcé le rôle de la conservation préventive au sein de la bibliothèque et a fourni une base solide et adaptable pour les travaux futurs.

Zusammenfassung

„Überarbeitung und Weiterentwicklung der Umweltleitlinien an der British Library“

Um ihre Sammlungen zu bewahren, müssen kulturelle Institutionen die Ursachen für Schäden, einschließlich Umweltfaktoren, verstehen und abmildern. In der Vergangenheit wurde dies in der British Library durch Richtlinien geregelt, die über Jahrzehnte hinweg—häufig ohne übergreifende Vorgaben—und als Reaktion auf wechselnde Anforderungen entwickelt wurden. Infolgedessen waren diese Richtlinien oft unzusammenhängend, komplex und nicht relevant für die gegenwärtige Praxis. Dieser Artikel befasst sich mit der Überprüfung, Überarbeitung und Anwendung der Leitlinien. Im Mittelpunkt stehen dabei die Bedürfnisse der Sammlung, die menschliche, betriebliche und praktische Erfordernisse einbeziehen, das pragmatische Verständnis für Zusammenhangsthemen und eine ausreichende Flexibilität, um Engagement zu fördern und Bibliotheksaktivitäten zu unterstützen, ohne die Sicherheit der Sammlung zu gefährden. Die überarbeitete Richtlinie hat eine Reihe von Vorteilen, nicht zuletzt die Tatsache, dass es sich um ein einziges, prägnantes Dokument handelt. Es verweist ausdrücklich auf Materialtypen und Schwachstellen sowie auf die Anforderungen operativer Aktivitäten und betont die Belange der präventiven Konservierung. Es ist für andere Beteiligte zugänglich, fördert eine wirksame Zusammenarbeit und führt zu erreichbaren Ergebnissen, die der Institution als Ganzes zugute kommen. Als solches hat es die Rolle der präventiven Konservierung innerhalb der Bibliothek gestärkt und eine solide und anpassungsfähige Grundlage für die zukünftige Arbeit geschaffen.

Resumen

“Revisando y desarrollando la política medioambiental de la Biblioteca Británica”

Para preservar sus colecciones, las instituciones patrimoniales deben conocer y mitigar las causas de los daños incluyendo los factores medioambientales. Históricamente, en la British Library, esto se abordaba mediante políticas desarrolladas a lo largo de décadas

—a menudo sin una orientación general—y en respuesta a requisitos cambiantes. Como resultado, estas políticas eran a menudo inconexas, complejas y poco representativas de la práctica actual. Este artículo aborda el examen, la revisión y la aplicación de unas políticas con un enfoque en las necesidades de la colección pero incorporando requisitos humanos, operativos y prácticos; la comprensión pragmática de los problemas que contribuyen a ello; y la flexibilidad suficiente para fomentar el compromiso y apoyar las actividades de la Biblioteca sin poner en peligro la seguridad de la colección. La política revisada ha aportado una serie de ventajas, entre las que destaca su carácter de documento único y conciso. Se hace referencia explícita a los tipos de material y sus vulnerabilidades, así como a los requisitos de las actividades operativas, haciendo hincapié en los aspectos de conservación preventiva. Es accesible a otras partes interesadas, lo que fomenta una colaboración eficaz y conduce a resultados alcanzables que benefician a la institución en su conjunto. Como tal, ha reforzado el papel de la conservación preventiva dentro de la Biblioteca y ha proporcionado una base sólida y adaptable para el trabajo futuro.

摘要

“关于大英图书馆环境政策的修订和制定”

为保护藏品，遗产机构必须了解并减少造成损坏的原因，包括环境因素。几十年来，大英图书馆一直以制定政策来解决这一问题——这些政策往往没有总体指导，且根据不断变化的要求而制定。因此，这些政策总是不连贯、复杂，且无法代表当前实践。本文论述了政策的审查、修订和应用。其依据是对藏品需求的关注，其中包含了对人、操作和实际的需求；对促成问题的务实理解；以及充足

的鼓励参与和支持图书馆活动的灵活性，同时又不危及藏品安全。修订后的政策具有多种益处，尤其是它成为了一份单一简明的文件。它明确提及了材料类型和脆弱性，以及操作性活动的要求，强调了预防性保护的事宜。其他利益相关者也可以利用该文件，鼓励有效合作，取得可实现的成果，使整个机构受益。因此，它加强了预防性保护在图书馆中的作用，并为今后的工作提供了坚实的、可调整的基础。

Biographies

Paul Garside studied chemistry the University of Southampton, where he remained to carry out research for a PhD investigating the properties of natural polymer fibres (awarded in 2002). He subsequently joined the Textile Conservation Centre as a researcher and lecturer for the centre's MA in textile conservation. He joined the British Library as Conservation Scientist in 2009, managing scientific analysis, environmental assessment and development of risk-management strategies. In 2021 he joined the Kelvin Centre for Conservation and Cultural Heritage Research (University of Glasgow) as Lecturer in Conservation Science.

Karen Bradford graduated with a degree in Conservation and Restoration from London Metropolitan University in 2010, and subsequently worked as a preventive conservator at Historic Royal Palaces. She joined the British Library in 2012 as part of the preventive conservation team, and her current role is as Collection Care Monitoring Conservator, covering pest management, emergency planning, environmental monitoring and training. She is also Secretary of the Icon Care of Collections Group.