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Silent Spores: Hidden Threats to Library Collections

ABSTRACT

This article explores the persistent and often overlooked threat of mold in library collections, using Western Carolina University's Hunter Library as a case study. Following multiple mold outbreaks exacerbated by aging infrastructure and environmental instability, the library undertook extensive remediation efforts, including large-scale weeding, relocation of materials, and environmental monitoring. A statewide survey of public and academic libraries revealed that mold and other environmental issues are widespread, often stemming from deferred maintenance, inadequate HVAC systems, and limited institutional support. The findings underscore the urgent need for proactive building management and sustainable funding solutions to preserve library collections. The article also examines available funding mechanisms in North Carolina, including grants and state aid, and highlights the challenges libraries face in securing resources for environmental remediation. By sharing Hunter Library's experience and broader survey insights, the authors aim to raise awareness and encourage collaborative strategies to protect library materials from environmental damage.

KEYWORDS: *library buildings, mold, material damage, deferred maintenance*

Western Carolina University (WCU) is the westernmost institution in the University of North Carolina System and serves a population of approximately 11,000 undergraduate and graduate students. The primary campus is in Cullowhee, NC, nestled near the Great Smoky and Blue Ridge mountains. WCU is part of the NC Promise program, which includes four UNC system schools that serve high numbers of students from traditionally underserved populations. Under this initiative, tuition is set at $500 per semester for all in-state students and $2,500 for out-of-state students. WCU maintains strong regional relationships, particularly with the Eastern Band of Cherokee Indians, an important and historically underserved community (Western Carolina University, n.d.).

Western Carolina University's Hunter Library has a long-standing history, with its original structure dating back to 1953 and expansions occurring in 1967 and 1982. A renovation in 2011 introduced several updates, including a modernized coffee shop featuring both external and internal access. However, much of the building's infrastructure remains outdated. The current HVAC system, for instance, was installed during the 1982 renovation, and portions of the ground-floor carpeting still date back to that era.

Our research indicates that such incremental updates are common in aging library buildings, while comprehensive remodels or complete rebuilds are far less frequent. Today, Hunter Library supports over 50 full-time equivalent faculty and staff, along with numerous student workers. On average, the library welcomes more than 6,215 visitors each week, including students, faculty, staff, and community members.

In the spring of 2022, a significant mold outbreak was discovered in the bound journal collection. Consultations with environmental specialists pointed to aging infrastructure and elevated humidity levels as likely contributors. This incident prompted a deeper investigation into environmental conditions in libraries and their impact on collections. To better understand the scope of the issue, we developed and distributed a survey to gather insights from other institutions regarding mold outbreaks and remediation efforts.

This article presents our ongoing experience at Hunter Library, shares findings from the survey, and explores the broader implications of deferred maintenance on the preservation of library collections.

The First Mold Outbreak: Evaluating and Cleaning Collections

The presence of mold in Hunter Library's bound journal collection came to our attention through an unexpected source. In November 2021, an air quality study was conducted in preparation for construction with the library's building partner, the Technology Commons, which is managed by WCU's IT department. Samples were taken to evaluate between No-

vember 2021 and March 2022. When the report was released in April 2022, it revealed a significant mold outbreak in the area housing the library's bound journal collection.

At that time, the mold appeared to affect only a portion of the collection, though the full extent was still unclear. By June 2022, the university became actively involved, providing training and support for cleaning the affected materials, as well as providing portable dehumidifiers throughout the building. Throughout the weeding and shifting process, staff volunteers were equipped with protective gear, including gloves and masks, to ensure their safety while handling compromised materials. A professional cleaning company was brought in to sanitize the shelving and remove certain volumes that were selected for weeding. Meanwhile, library staff worked collaboratively to clean and retain other affected titles, making decisions based on the condition of the materials and their value to the collection. University administration also provided direct financial support of $150,000 in one-time funds to purchase electronic backfiles of journals that were lost due to the mold outbreak.

Unfortunately, during the summer of 2022, the campus HVAC and air dehumidification system was shut down for scheduled upgrades and maintenance, causing humidity levels inside the library to spike dramatically. These conditions created an ideal environment for mold to spread, leading to a second, more widespread outbreak that affected a much larger portion of the collection. As a result, the focus shifted from cleaning to weeding and removing damaged materials.

The Second Mold Outbreak: Weeding and Shifting the Collection

Once we discovered the renewed outbreak of mold on our bound journal collection, it became clear that our cleaning efforts would not remain effective. A large weeding project was coordinated after consultation with subject librarians and library administration. By running a list of all titles in the bound journal collection, librarians had an opportunity to evaluate the entire collection and make weeding decisions. Items that had been identified with mold were marked, and those were given priority for evaluation. While the items weeded first included those with heavy mold, there were more decisions made on other titles that could be discarded, as print journals are seeing far less use than in the past, and electronic access is increasing. Once decisions were made in the first round of weeding, the library rented dumpsters, and volunteers from the library, as well as university facilities, spent several weeks disposing of affected items. During this time, we also applied for and received one-time funds from the university to purchase electronic backfiles of some critical titles. We could not order every title that had been prioritized due to cost and availability, but we were able to achieve most of our wish list, as well as a large-format book cutter that allowed us to cut covers off books and recycle the pages, or to prepare for rebinding. These efforts led us to believe we had contained and mitigated our mold issue. However, we soon experienced another outbreak.

After new mold was discovered, a second round of weeding took place. We now had to decide if keeping the journals in the same location made sense. We ultimately decided to move the location of our bound journals to a different floor in the library, where we kept older bound journal titles. We ordered new shelving to accommodate the extra volumes and began moving them. Student workers were hired for the express purpose of cleaning and moving books. Because we were dealing with such a large number of volumes, despite the weeding, and because library workers could only donate so much time to this project, we spent several months moving journals, identifying further volumes to weed, and setting priorities for cleaning or rebinding our most important titles.

Third Outbreak: Professional Mitigation and Safety Concerns

Mold growth or regrowth was found on the pages of some books, and the decision to rebind certain titles was abandoned. At this point, staff exhaustion and our ability to continue managing this extra workload were beginning to show. There was also ongoing, widespread concern among the staff about the safety of the air quality within the library building. While there are standards for a variety of indoor air pollutants, the U.S. Centers for Disease Control and

Prevention does not recommend routine sampling for mold because there are no established standards for determining what constitutes a "normal" level (Thompson & Dion, 2023, p. 22). Library administration requested and were granted funds to hire an outside firm to remove the rest of the mold-affected volumes identified for weeding. Library staff moved the rest of the collection to its new location, leaving empty shelves where roughly 56,000 volumes once lived. The new location for the reduced bound journal collection was already housing a portion of the journals. This area is less humid and has more airflow in general due to being on a mezzanine level open to the floor below. Significant time was dedicated to logistical planning to ensure there would be enough room to move the rest of the collection. Measuring shelving based on the number of inches needed, the library ordered an extra set of shelves and was able to safely begin planning to move it all. Additionally, the university paid for a second, comprehensive air quality study in the library building with a particular focus on employee workspaces and areas used by the public. While there are no firm guidelines for mold levels indoors, the type of mold found in the building is generally not considered dangerous, with concentrations of mold outside the building being equal to those inside. This helped alleviate concerns about indoor air quality, allowing us to focus on mitigation efforts for our physical collections.

Survey

To better understand the scope of environmental challenges facing libraries across the state, during the fall of 2023, the authors conducted a survey of public and academic institutions. A Qualtrics survey was distributed to the NCLA and Lyrasis email lists. It was also made available at the 2023 NCLA biennial Conference. There were 62 responses received, including 29 academic libraries, 26 public libraries, 2 community colleges, 3 special libraries, and 2 other libraries from North Carolina. The results revealed a troubling pattern: mold outbreaks and related issues are not isolated incidents, but part of a broader systemic problem linked to aging facilities and insufficient infrastructure.

During our survey, we asked the question, "What do you suspect caused the environmental issues?" A total of 35% of respondents cited HVAC, temperature, and humidity issues as a primary concern. Building leaks were mentioned by 28%, followed by plumbing problems at 20%, and natural disasters at 6%. An additional 11% selected "other," often elaborating with responses such as "deferred maintenance," "aging HVAC equipment," "age of structure," "lack of upkeep," "poorly built facility," and "poor maintenance by the city and county." Collectively, these responses underscore a broader theme of deferred maintenance.

Institutional Funding – Public Libraries

We asked in our survey, "*Did you receive institutional support?*" regarding mitigation efforts with environmental issues. Of the public libraries surveyed, 73% reported that they did receive some form of support. For instance, one library upgraded its HVAC filtration system as part of COVID-19 mitigation efforts, which also resolved a persistent mold problem around ceiling vents. Despite ongoing building leaks due to overlapping jurisdiction between the county and the shopping center from which the building is leased, the HVAC upgrade indirectly solved the mold issue. However, staff felt that mold concerns were previously not taken seriously due to potential mitigation and liability costs, leading to a lack of institutional confidence.

Another library benefited from county support, which included bringing in professional cleaners and movers to resolve mold issues. Subsequently, the entire building was torn down and rebuilt from the ground up in 2017. This comprehensive approach ensured a fresh start and addressed all underlying problems.

Additionally, a third library tackled mold and structural issues by cleaning the HVAC system, replacing moldy insulation, and fixing roof areas where leaks occurred. Temporary measures, such as covering affected collections with plastic sheets, were implemented until repairs could be completed. The involvement of city property management specialists and health and safety representatives further ensured thorough assessments and renovations.

The other 27% of public libraries said their institution did not provide any support and have struggled with maintenance issues due to a lack of institutional funding. One library, for example, noted that

"we wiped down all the bound volumes in our local history/genealogy room once a year to try to remove mold and mildew. We used ARPA funds to install a whole-system dehumidifier in our basement meeting room. County maintenance tries to repair leaks as they find them, but the general humidity issues are much more difficult to solve." In cases like this, staff have had to rely on annual manual cleaning efforts to combat mold and mildew, and while county maintenance attempts to address leaks as they arise, a comprehensive solution for the local history/genealogy room remains out of reach due to the lack of secured funding for long-term renovations.

Another library has faced similar challenges, with the town's maintenance crew addressing leaks and the Friends of the Library purchasing a new HVAC system. Despite these efforts, the older building continues to present various problems that are addressed on a case-by-case basis. The library is actively striving to raise funds for a new building to better meet their needs, highlighting the ongoing struggle for adequate institutional support.

Institutional Funding: Four-Year Academic Libraries

Regarding four-year academic libraries, 79% of respondents said their institution received support for mitigation efforts of environmental issues. Institutional funding has proven crucial for academic libraries in managing and mitigating various disasters. One four-year college experienced a major flood that required extensive repairs, including asbestos remediation, after experiencing water damage to equipment and supplies. Despite the lack of funding for immediate solutions, the library managed to dry out wet photo prints by closing off its exhibit gallery and reading room. Currently, they are dealing with a mold outbreak caused by a new HVAC unit installed without humidity control and suffering from high humidity for a length of time. The library is now exploring dehumidification options, but the question remains whether the university or the library will bear the costs. The situation underscores the need for proactive funding to prevent such predictable issues from escalating.

Another four-year college has faced recurring mold problems due to inadequate HVAC systems that fail to control humidity, especially during the summer. Despite cleaning the books multiple times, the mold keeps returning. The high humidity in their geographic location exacerbates the issue, and the aging HVAC systems are unable to manage it effectively. The library remains hopeful that the administration will address the HVAC system in the future, highlighting the ongoing need for institutional support to maintain a healthy and functional environment.

The other 21% of four-year institutions did not receive institutional support and faced significant challenges due to a lack of funding. One library had to pull thousands of affected items for manual cleaning and install thermometers and humidity checkers to monitor conditions. Staff described how "multiple thousands of books were cleaned by hand, using a vacuum with a HEPA filter"—a process that required extensive staff time and labor. Even with these efforts, the institution provided minimal support, forcing the library to rely on dehumidifiers running constantly.

Another library corrected a leaking pipe but continues to experience regular HVAC issues. They said that a comprehensive space improvement project is needed to fully address problems related to air flow regulation and window upgrades. While their monitoring system and tracking have helped prevent a larger mold outbreak, the lack of funding and capacity for significant improvements remains a major obstacle and underscores the importance of institutional support in maintaining and upgrading library facilities to ensure they remain functional and safe.

Deferred Maintenance

Because many responses to our survey cited deferred maintenance as one cause of the issues, it makes sense to define that term. Deferred maintenance is "the postponement of maintenance for any reason, such as the need to keep equipment in full-time operation, the lack of funds for repair, or the unavailability of parts" (Harris, 2006). Older buildings, deferred maintenance, and deteriorating equipment are common contributors to environmental issues in libraries. "As a rule, buildings have two critical stages in their lifetimes: At 25 years, a building needs significant updates and renovations; at 50, a major overhaul of its

structure and systems" (Carlson 2023). With so much construction happening in higher education in the post-World War II years, many colleges are facing the same issues of deteriorating facilities. Since so many buildings are due for renovation at similar times, it is easy for these issues to fall behind schedule.

Mitigation Efforts

Mitigation efforts across libraries varied widely, reflecting differences in building age, climate conditions, staffing levels, and available resources. Yet several common strategies emerged from our survey responses, offering a clearer picture of how institutions are attempting to address environmental challenges before they escalate into full-scale preservation crises. These are a few of the statements our survey takers shared in response to the question, "What mitigation or remediation efforts did you take?" Their answers reveal both the creativity and the constraints that shape environmental management in library spaces.

- "Twice we hired an outside vendor to remediate the books on-site. Since then, we have had smaller outbreaks that we are attempting to deal with. For the environment we started to track the temp and [relative humidity] daily and also set up dehumidifiers that we emptied daily."
- "We removed all the affected wood flooring and replaced with vinyl. [The] Leak is still present, but a small dam was constructed to hold back the waters from affecting the collection storage when it rains."
- "We pulled all the affected items, cleaned as best we could. We installed thermometer and humidity checkers, but, for the most part, the institution did not provide support."
- "Currently, the county is putting band-aids on the issue. Our whole HVAC system needs to be gone through. The builders used compression fittings, which are now catastrophically failing."
- "Mold remediation; window repair (to repair leak); attempts have been made to fix the HVAC, which is the source of the mold issues, but so far we have been unable to fix, and do not have the funds to replace."
- "First, we had a leaking roof.…When the holes in the roof were eliminated, air had nowhere to go. That's when we were told that the whole design of the HVAC ductwork was flawed. Previously (2005), we were told that the system installed when the building was built was obsolete at the time, so it cannot be repaired because there are no parts available.…Since 2016, mold has become a widespread losing battle. Since the roof was repaired, the university has allocated no funds to mitigate the problem.

While not surprising, the results of our survey did show similarities between different types of libraries and their buildings. Deferred maintenance of issues such as leaks and HVAC systems is common, and libraries have had to be increasingly adaptable to find work-arounds and solutions to these problems.

Funding Resources

Trying to mitigate environmental issues in library buildings can be costly, and funding options vary depending on the system that supports the library. In this section, we will describe funding resources that are available to support libraries.

Grants

Grant funding is a great way to update library services and bring innovative ideas into a library. Library Services and Technology Act (LSTA) Grants are funded by the federal Institute of Museum and Library Services (IMLS) through the State Library of North Carolina. Public, academic, and community college libraries that meet a specific need can apply for an LSTA grant. However, securing LSTA funding for environmental issues may be challenging. Unallowable expenditures include the construction or renovation of a building, as well as preservation activities or materials for preservation. This could mean that if a library has a leaky roof that needs to be repaired, they could not apply for an LSTA grant to fund it (State Library of North Carolina, n.d.). That said, allowable expenditures such as consulting or contractual services, furnishings, or materials that support a project can still be leveraged creatively to address parts of an environmental issue.

As of mid-2025, however, the future of IMLS and LSTA funding is uncertain. A recent executive order aims to dismantle IMLS "to the maximum extent of the law, and the agencies are ordered to reduce their services and personnel to the minimum amount required to perform the functions required by law" (American Library Association, 2025, para. 3). While this executive order plays out in courts, there is much uncertainty over the future of IMLS. As a result,

libraries may need to seek alternative funding sources or advocate more strongly for the restoration of federal support to address critical infrastructure and environmental challenges.

Libraries in North Carolina seeking external support for building improvements or environmental upgrades can look to the American Library Association's Libraries Transforming Communities: Accessible Small and Rural Communities grant program. This national initiative offers $10,000–$20,000 awards to small and rural libraries to enhance the accessibility and resilience of their facilities, services, and programs. The grant is open to eligible libraries in all U.S. states, and recent funding rounds have supported hundreds of institutions across 48 states. For North Carolina libraries facing environmental challenges, this program represents a valuable opportunity to secure resources for meaningful, community-focused improvements.

Funding for North Carolina Public Libraries

In North Carolina, public libraries are primarily funded through a combination of state and local funding sources. The North Carolina General Assembly appropriates funds for public libraries through the annual state budget, supporting statewide library initiatives, system administration, and local services. Local funding typically comes from county appropriations, municipal allocations, and library taxes. However, deferred maintenance on public libraries can be costly to the communities they serve. When maintenance is delayed, minor issues can escalate into major problems, leading to higher repair costs, loss of collections, and potential disruptions in library services. This can negatively impact the community by reducing access to valuable resources and safe, welcoming spaces. Addressing maintenance needs promptly is crucial to avoid these escalating costs and ensure libraries remain functional and beneficial to the public.

Non-recurring State Fiscal Recovery Funds (SFRF) Aid to Public Libraries was an initiative funded by the North Carolina General Assembly during the 2022-2023 fiscal year. This funding was part of the North Carolina allocation from the American Rescue Plan Act (ARPA)'s State and Local Fiscal Recovery Funds. Allowable expenditures included capital improvements such as carpet, ceiling, floor repair or replacement, and environmental remediation for things such as mold, improvements to HVAC systems, or adding a dehumidification system. These funds have been distributed to North Carolina public libraries that qualify for State Aid to Public Libraries and have been given out in lump sums: the first during the 2023-2024 Fiscal Year (FY), and the second in the 2024-2025 FY. These funds need to be spent by December 31, 2026.

The Aid to Public Libraries Fund, better known as "State Aid," supports North Carolina public libraries by enhancing and balancing library services across the state. To access this aid each fiscal year, North Carolina public libraries must submit a completed application along with supporting documents. However, these grants cannot be used for capital expenditures, which include acquiring real property, new construction, renovating existing facilities, and making repairs and renovations, as defined by North Carolina General Statute 143C-8-13.

Conclusions

We were not surprised that other libraries experienced environmental issues. North Carolina can experience many extreme weather events such as hurricanes, heavy snowfall, and torrential downpours, throughout the state. Additionally, most library buildings are reliant on entities such as city and county facilities management or college/university administration to maintain their buildings. With so many other competing departments at the local and state levels, libraries are often placed at the bottom of renovation and rebuilding plans. However, many of the problems stated in the survey could have been prevented by timely maintenance and renovation. HVAC systems in particular were a concern for many survey respondents, and some libraries described only being able to take minimal action in the face of larger issues—one respondent noted they simply "shifted books to get them away from leaks. Put up caution tape. That's it." Outside factors, such as inflation and labor costs, are a determining factor when deciding if buildings are eligible for improvements, and often, the money is just not there. Library administrators are encouraged to seek other funding sources to improve and update library spaces.

Look to the future

Hunter Library staff are still finding mold on books in parts of the general collection, especially on the ground floor, where temperature and humidity levels tend to fluctuate the most. Mold outbreaks seem to be concentrated in areas with consistently higher humidity. In response, library leadership, staff, and facilities worked to put some temporary solutions in place, like shifting the collection to improve airflow, using floor fans, and running industrial-strength dehumidifiers. These steps have helped slow the spread, but they're not sustainable in the long run. For example, the dehumidifiers need to be emptied twice a day, which takes time and staff effort.

The good news is that a new, more powerful whole-building dehumidification system will be installed, which is a major step toward stabilizing the environment throughout the library and protecting our collections more effectively.

As we move forward, we plan to keep monitoring conditions, learning from others, and sharing what we find. We hope that this work not only helps the Hunter Library but also sparks conversations at other institutions facing similar challenges. Environmental issues in libraries aren't always visible until they become serious, but with more awareness, collaboration, and creative problem-solving, we can all do a better job of preserving the materials on which our communities rely.

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References

American Library Association. (2025, July 10). FAQ: Executive Order Targeting IMLS. https://www.ala.org/faq-executive-order-targeting-imls

Bertie County Public Library & Cooperative Extension Planning. (n.d.). Golden LEAF Foundation. Retrieved August 15, 2025, from https://goldenleaf.org/grants/bertie-county-public-library-cooperative-extension-planning-2/

Bryson City NC Library Expansion and Renovation Project. (n.d.). Marianna Black Library Expansion. Retrieved August 14, 2025, from https://swaincountylibraryproject.com/

Carlson, S. (2023). The Backlog That Could Threaten Higher Ed's Viability: A big bill for deferred maintenance is coming due. *The Chronicle of Higher Education*. Retrieved January 26, 2026, from https://www.proquest.com/docview/2899405909/abstract/A3C81227090F4E4CPQ/1

Harris, C. (Ed.). (2006). Deferred maintenance. In *Dictionary of Architecture and Construction* (4th ed.). https://search.credoreference.com/articles/Qm9va0FydGljbGU6MjM3ODY0Mg==?aid=99341

Iredell County Public Library. (2025). Retrieved January 26, 2026, from https://www.facebook.com/iredelllibrary/posts/our-brand-new-mobile-library-has-officially-arrived-and-we-cant-wait-to-hit-the-/1125862692911894/

Kruen, A. (2019, May 1). Gunn Memorial Public Library Receives a $995,000 Zero-Interest Loan for Expansion | Piedmont Electric. Piedmont Electric Cooperative. https://pemc.coop/gunn-memorial-public-library-receives-a-995000-zero-interest-loan-for-expansion/

Institute of Museum and Library Services grants in NC fact sheet. (n.d.). Retrieved August 19, 2025, from https://statelibrary.ncdcr.gov/lsta-federal-funding-north-carolina

Thompson, M., & Dion, K. (2023). Breaking the Mold. *American School & University*, 95(6), 22–24.

Western Carolina University. (n.d.). About Western Carolina. Retrieved August 19, 2025, from https://www.wcu.edu/discover/index.aspx