



Floods, Humidity, and Mold in Libraries

David Walls, Preservation Librarian
U.S. GPO. September 14, 2022



Your library



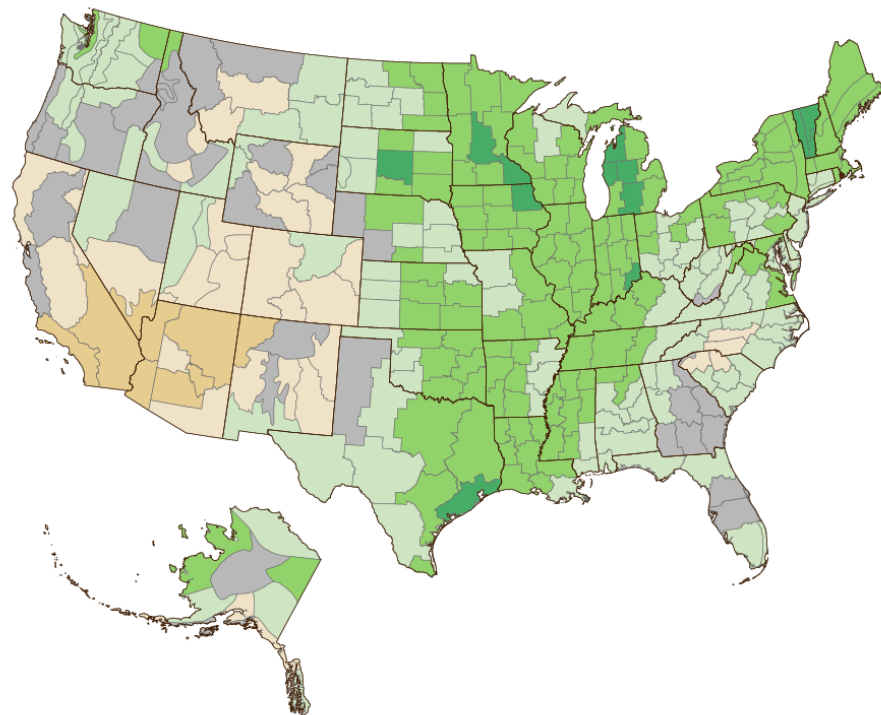


Location?

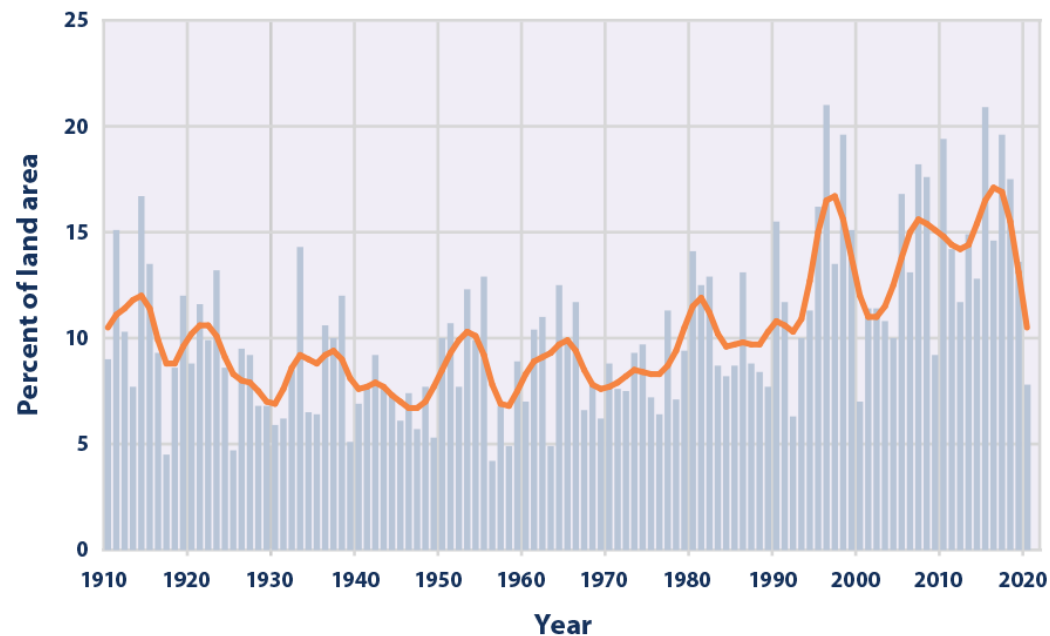




Warmer and Wetter



Percent change in precipitation:



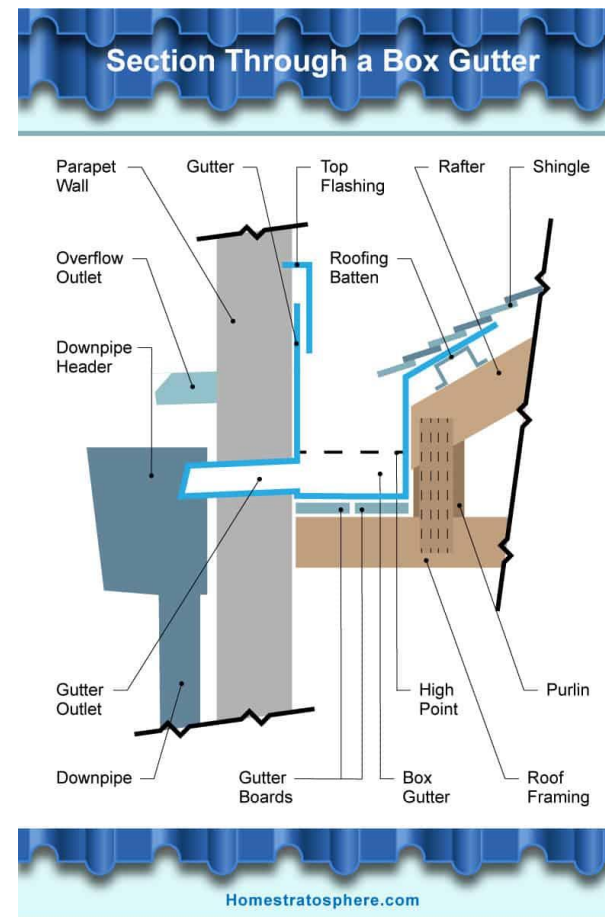


Built for then



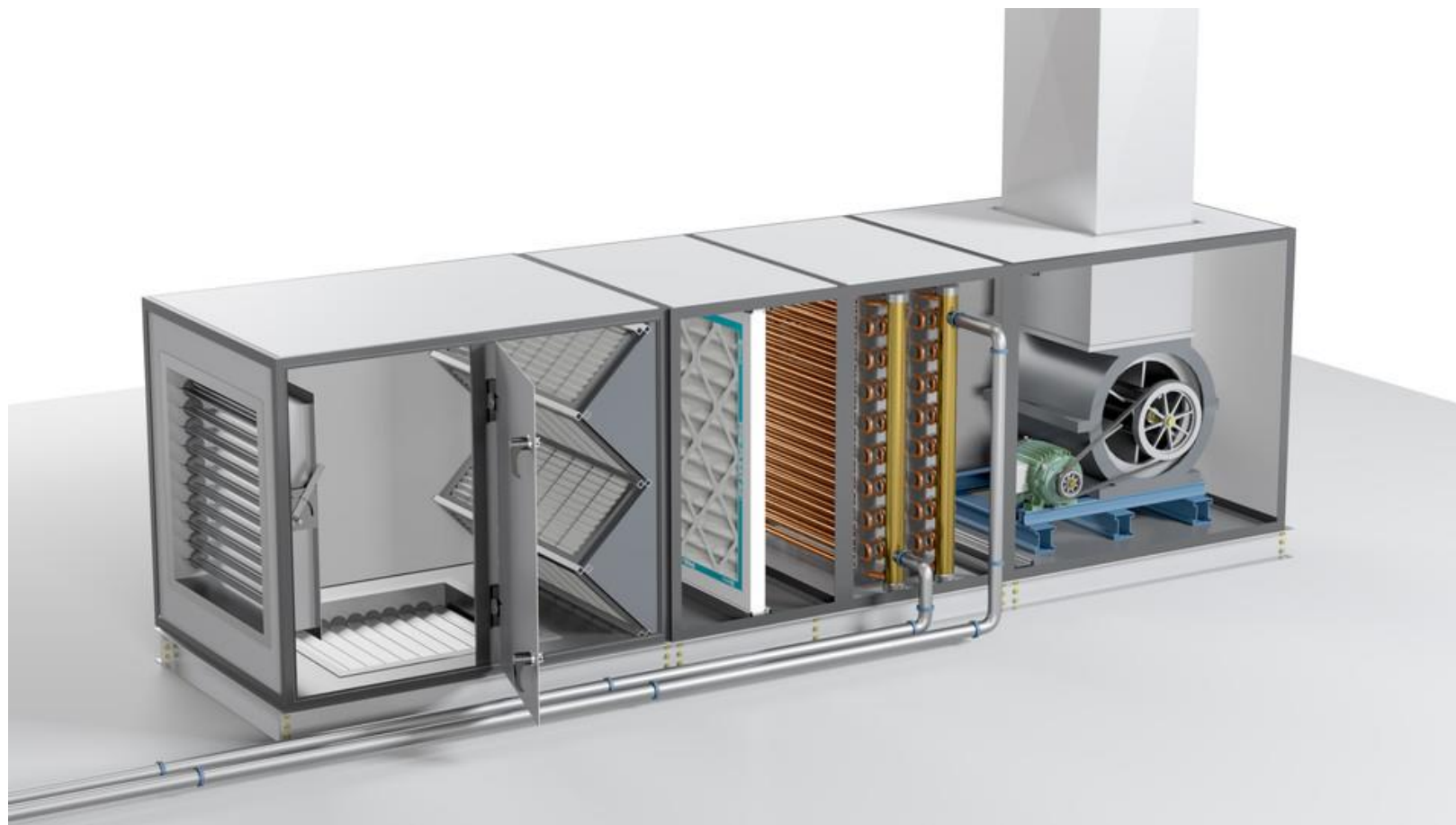


The Roof and Rainwater





HVAC: Air Handler





Sources of Water in Libraries



- Fire suppression
- Hot and cold fresh water
- Hot water radiators
- Hot water to HVAC Heat Exchangers
- Steam to HVAC
- Chiller water to HVAC
- Condensation return
- Sewage
- Rain water



Leaks and Floods





Relative Humidity



“Relative humidity is the amount of water vapor actually in the air, expressed as a percentage of the maximum amount of water vapor the air can hold at the same temperature.”



Temperature and Humidity



Temperature between 70F. and 80F.
Relative Humidity between 30% and 50%



Water and mold

- Delayed response makes disaster worse!
- Visible water equals increased humidity
- Water alarms can warn of rising water when the library is closed





Notify us: Ask GPO



Report a library disaster that impacts the collection and services as soon as possible!



Mold



- Twenty six species of molds are common.
- Mold is ever present in the air
- Humidity over 50%
- Temperature over 80
- Stagnant or slow moving air
- Dark conditions in storage areas
- More frequent in basements



Mold





Mold culture testing report

Mold Lab Results.pdf - Adobe Acrobat Pro DC (32-bit)

File Edit View E-Sign Window Help

Home Tools Mold Lab Results.pdf x

2 / 15 100%

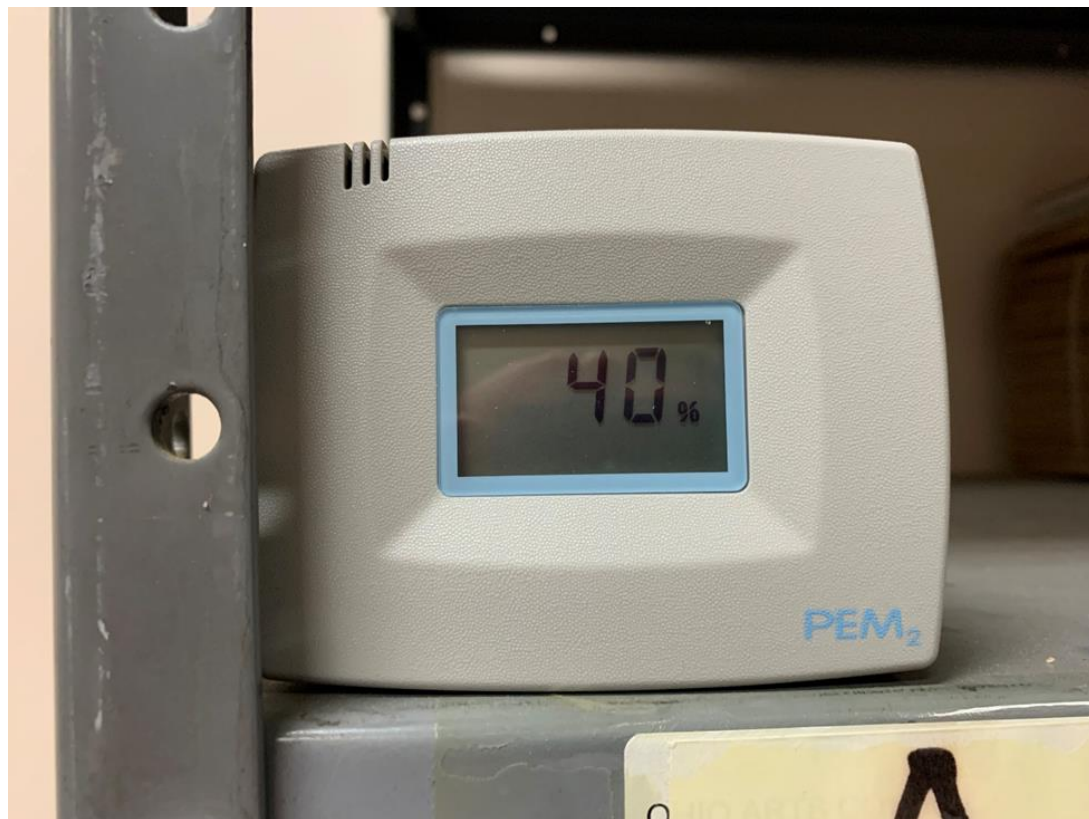
Quantitative Viable Fungal Report (Swab)

Attn: Environmental Testing Group		Date Sampled:	11/21/2020	
DBA / Mold Inspection Testing		Date Received:	11/30/2020	
650 W. Grand Ave, Suite 302		Date Analyzed:	12/8/2020	
Elmhurst, IL 60126		Date Reported:	12/8/2020	
		Project Name:	LA Beeghly Library Ohio Wesleyan	
		Project Address/Number:	43 Bowland Ave	
		Project City, State ZIP:	Delaware, OH 43015	
		SEEML Reference # :	201130001	
Test method: Viable Swab				
Client Sample ID	2002586-1	2002586-2	2002586-3	
Location	Section 12 Row 4	Section 12 Row 3	Section 12 Row 2	
SEEML Sample ID	201130001-001	201130001-002	201130001-003	
Area/sample amount	1	1	1	
Media Used	MEA		MEA	
	raw ct.	cfu**/inch ²	%	raw ct.
				cfu**/inch ²
				%
Alternaria				
Aspergillus flavus				
Aspergillus fumigatus				
Aspergillus glaucus				
Aspergillus nidulans				
Aspergillus niger				
Aspergillus sydowii				
Aspergillus versicolor				
Aspergillus other				
Aureobasidium				
Botrytis				
Chaetomium				

10:45 AM 9/14/2022



Dehumidification





Know what you have

- Documentation of holdings
- Age of materials
- Special Collections
- Items with specific historic or artifactual value
- Location of collections in the building?





Assessing Risks: Floor Storage





Risk Checklist

- Building location, storms, flood plain
- Known building system issues: leaks, drainage, flooding, humidity?
- Collections Stored in the basement?
- Collections stored remotely?
- Materials directly on the floor?
- Collections close to large windows
- Collection items inventoried through the catalog or other documents
- Building and collection areas monitored



Response Checklist

- Building and environmental risks assessed and monitored
- Disaster Response and Recovery Team organized and trained
- Disaster Response and Recovery supplies secured and accessible
- Disaster Response Plan developed with a telephone tree for staff and facilities.
- Disaster Response plan communicated with administration and building maintenance and security.
- Keep a copy of the Response Plan in paper at home.
- Monitor weather



Supplies Checklist

- Plastic Sheeting
- Duct Tape
- Data loggers for remote monitoring
- Buckets and mops
- Wet dry vacuum
- Rubber or nitrile gloves
- Floor fans
- Space to dry books (tables or a clean, dry floor)
- Paper towels
- Source of emergency funds to purchase more supplies



Plastic Sheeting





Dataloggers



- Relatively low cost
- Provides a 24 hour/7 day record of temperature and humidity
- Useful for documenting condition in collection areas



Wet/Dry vacuums





Air Circulation





Paper towels for drying wet books





Drying wet books





Know your limits!

- The response and recovery plan should have definite limits of what staff can be expected to do in response to a disaster.
- Moderate to Severe disasters may be too large for staff to handle without assistance from a disaster response and recovery service.
- Service contracts should be arranged in advance and services may be paid for by insurance.





How not to mold: Disaster response

- Assess Risk
- Plan an appropriate response and documenting it in a tangible plan
- Develop a response team and distribute copies of the plan
- Communicate the plan with administration and infrastructure support
- Respond to known risks when weather threats arise
- Respond to disasters within established safety limits
- Document the recovery effort to restore materials and services
- Communicate the recovery effort to appropriate sources
- Restock supplies
- Review effectiveness and adjust plan and training as needed.



Sources

- www.noaa.gov
- www.nhc.noaa.gov
- www.weather.gov
- www.climate.gov
- <https://www.epa.gov/climate-indicators/climate-change-indicators-us-and-global-precipitation>



David Walls, Preservation Librarian,
U.S. Government Publishing Office

dwalls@gpo.gov OR

preservefedinfo@gpo.gov