

Research on Sustainable Preservation Environments

James M. Reilly
Image Permanence Institute
Rochester Institute of Technology

Vision: Manage Library Environments Sustainably



How can Preservation Environments Become More Sustainable?

- Acquire the ability to manage them
- Manage them to use less energy
- Document improvements and gain support from institutional leadership

In This Presentation...

Lessons and Experience

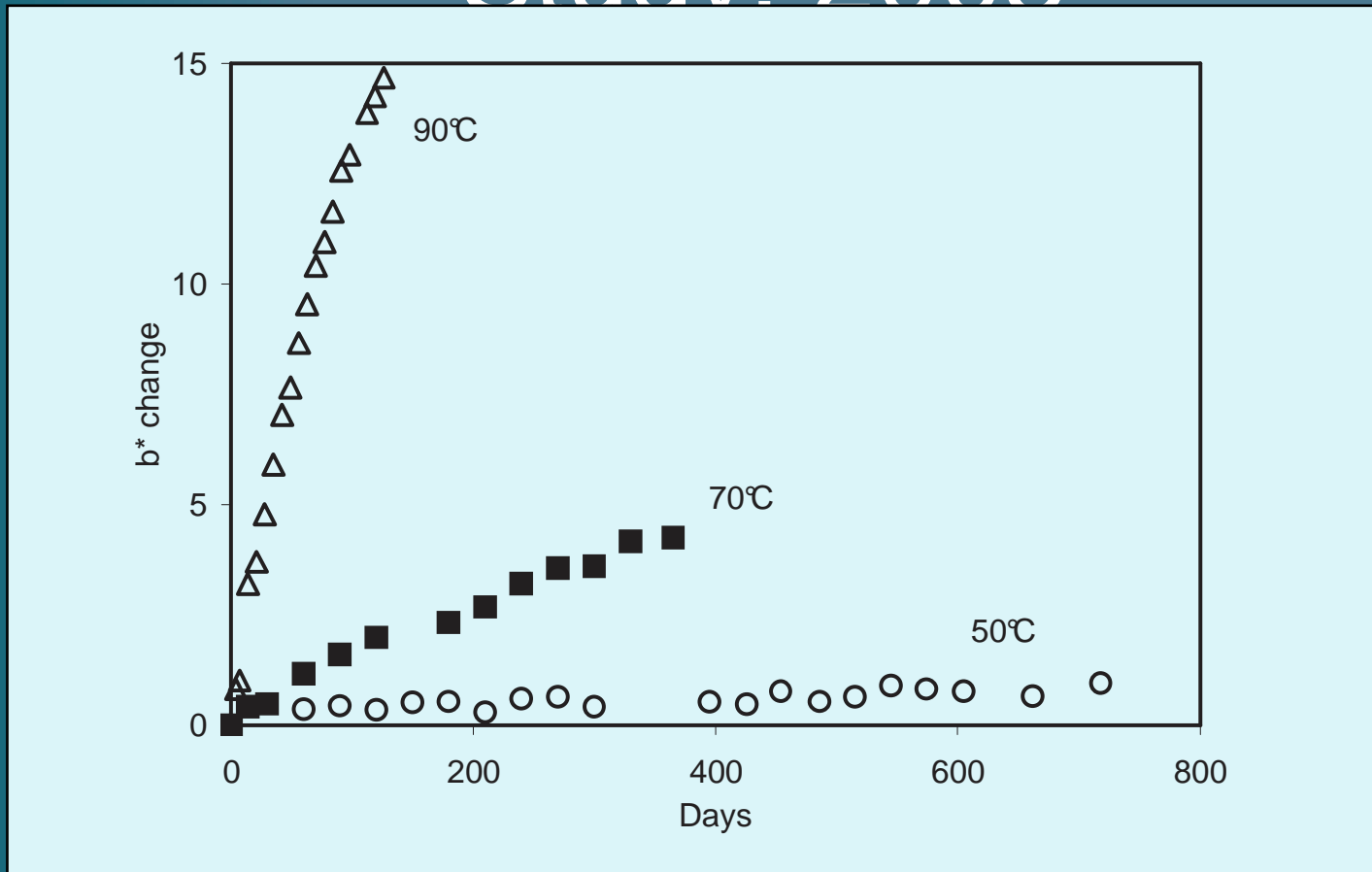
Research in Progress



IPI and Environment

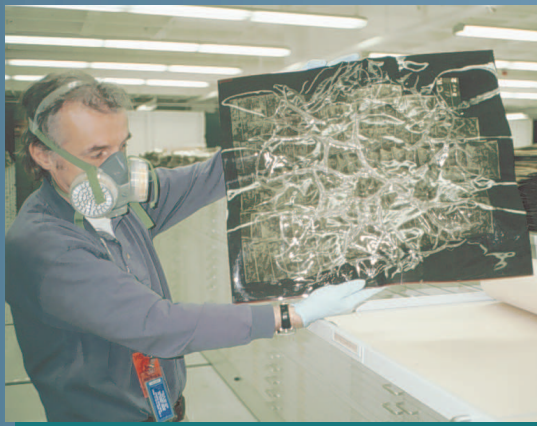
- More than 25 years of research on materials preservation
- Development of hardware, software and web-based tools for environmental management
 - 500 institutional users
- Field experience with optimizing energy use and managing environments

Effect of Temperature on Paper Discoloration – IPI Study, 2003



Chemical Change

In 1984, the author was a Professor of Architecture and Associate Director for Graduate Studies in 1992. His publications include: *David B. Brownlee* (New York: Rizzoli, 1984); *Toward Architectural History* (New York: MIT Press, 1989); "Elia Scharin: Tradition in Architecture and Urban Design," *Cranebrook Visio*, 1991-1992 (New York: 293-301); "Bruce Goff and the Evolution of



Mechanical (Physical) Decay



Biological Decay

- Mold
- Insects
- Animals
- Bacteria



Environmental Management

Gather temperature and humidity data



Analyze using metrics

Natural Aging

Mechanical Damage

Mold

Metal Corrosion



Analysis with IPI Preservation Metrics

Dataset	NRR_II_(Reader_shelves)
Risk Summary	
Natural Aging	RISK
Mechanical Damage	Good
Mold Growth	Good
Metal Corrosion	OK
Preservation Metrics	
TWPI	29
MRF	0
% DC Max	0.45
% EMC Min	8.5
EMC Max	10.2
EMC Mean	9.25
Data Overview	
Start	2008-11-20
End	2009-10-21
T°F _{mean}	73.8
% RH _{mean}	50.2
DP°F _{mean}	54

Collaboration with Herzog / Wheeler since 1999



Big Machines, Big Money



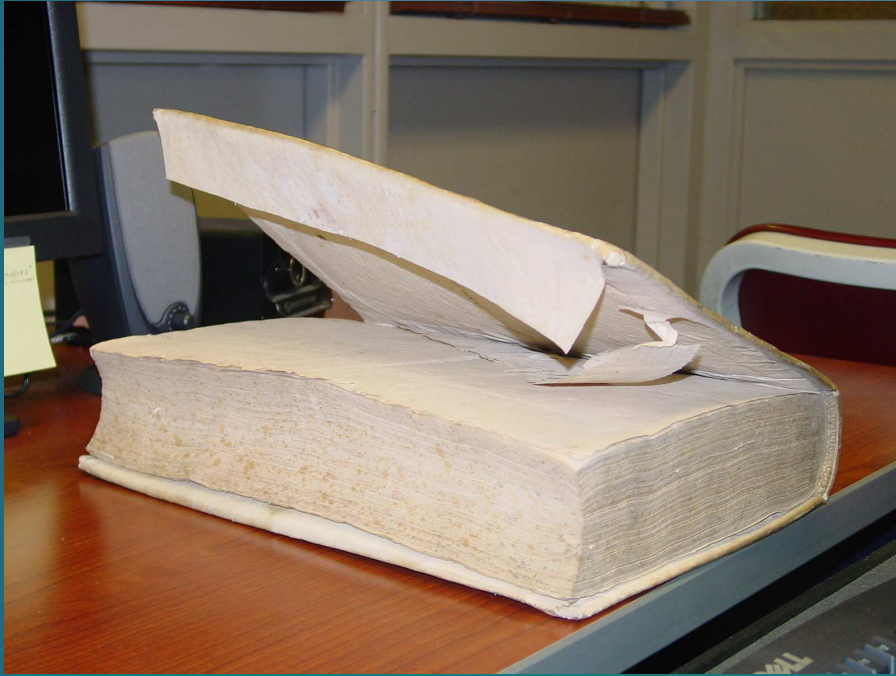
Big Machines, Big Money

Adams South AHU	Annual Costs
Cooling \$	110,000
Heating \$	98,000
Fan \$	25,650
Total	\$ 233,650

Collections: *Really Big Money*



Books Ruined by Improper Environment...



Priceless

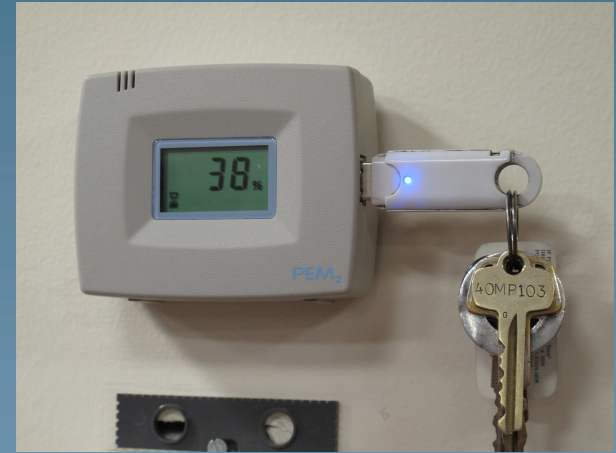
Environmental Management Tools

PEM2 datalogger to Gather
temperature and
humidity data: \$ 349



Analyze using metrics and Graphs on
Pemdata.org website: Free

Natural Aging
Mechanical Damage
Mold
Metal Corrosion



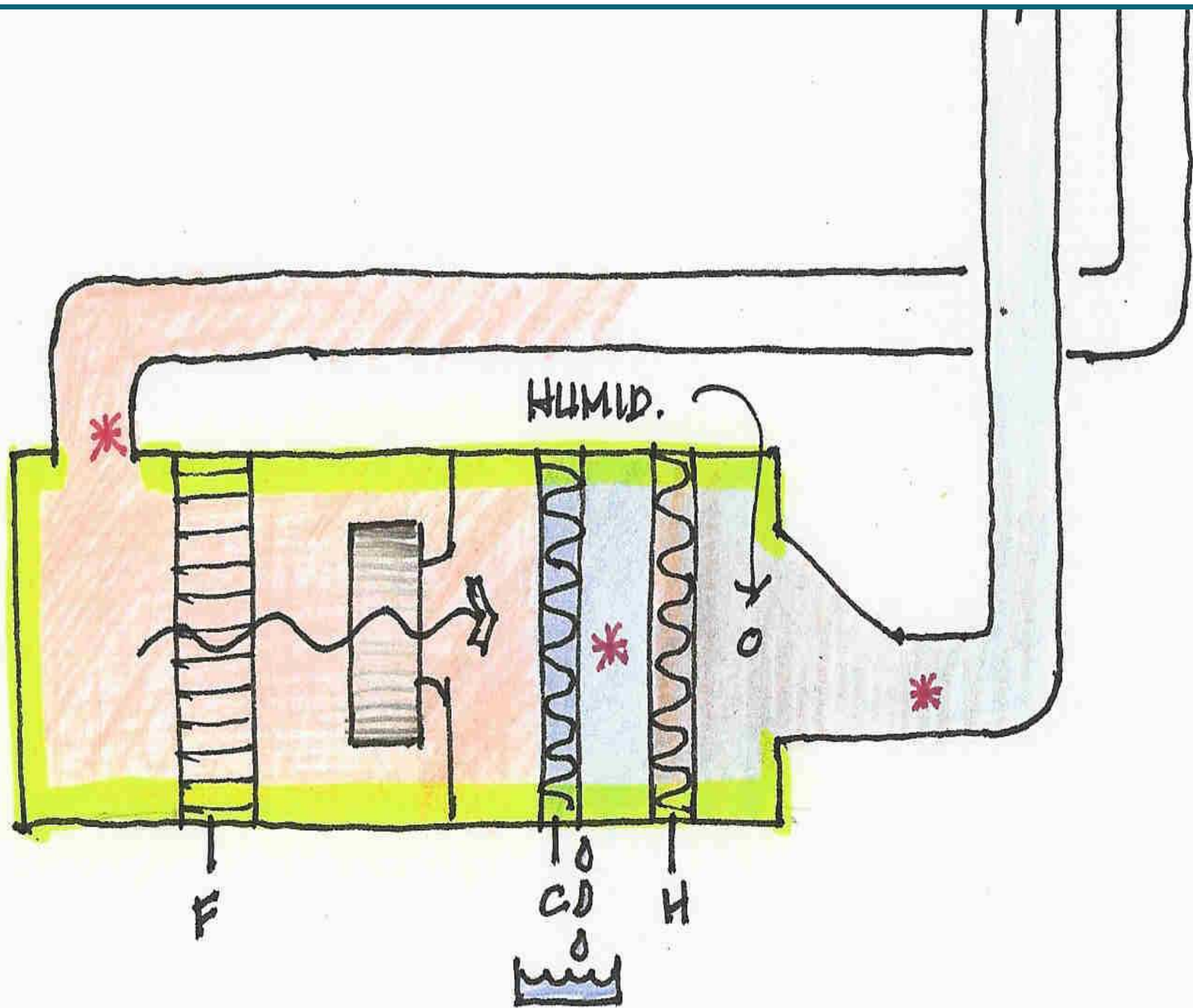
Lessons

- Preservation has no ability to manage environments sustainably without:
 - Its own capability to acquire and analyze data
 - A staff person assigned to the task who understands HVAC operations
 - A process for working together with building operators to achieve clearly understood goals

Lessons

- Facilities Departments and Building Operators
 - Lack adequate time and staff to do their job
 - Usually welcome knowledgeable partners
 - Often do not understand how their systems actually work (parallel: pres. Managers who do not know what kind of environment their collections actually live in)
 - Respond mainly to complaints and project requests





IPI Research in Progress

- Complete shutdowns in Selected Spaces
- Use of aggressive setbacks
- Improvements in analysis software and data gathering hardware
- Program of 5 2-Day seminars on sustainable operations

Shutdowns During Unoccupied Hours in Selected Spaces

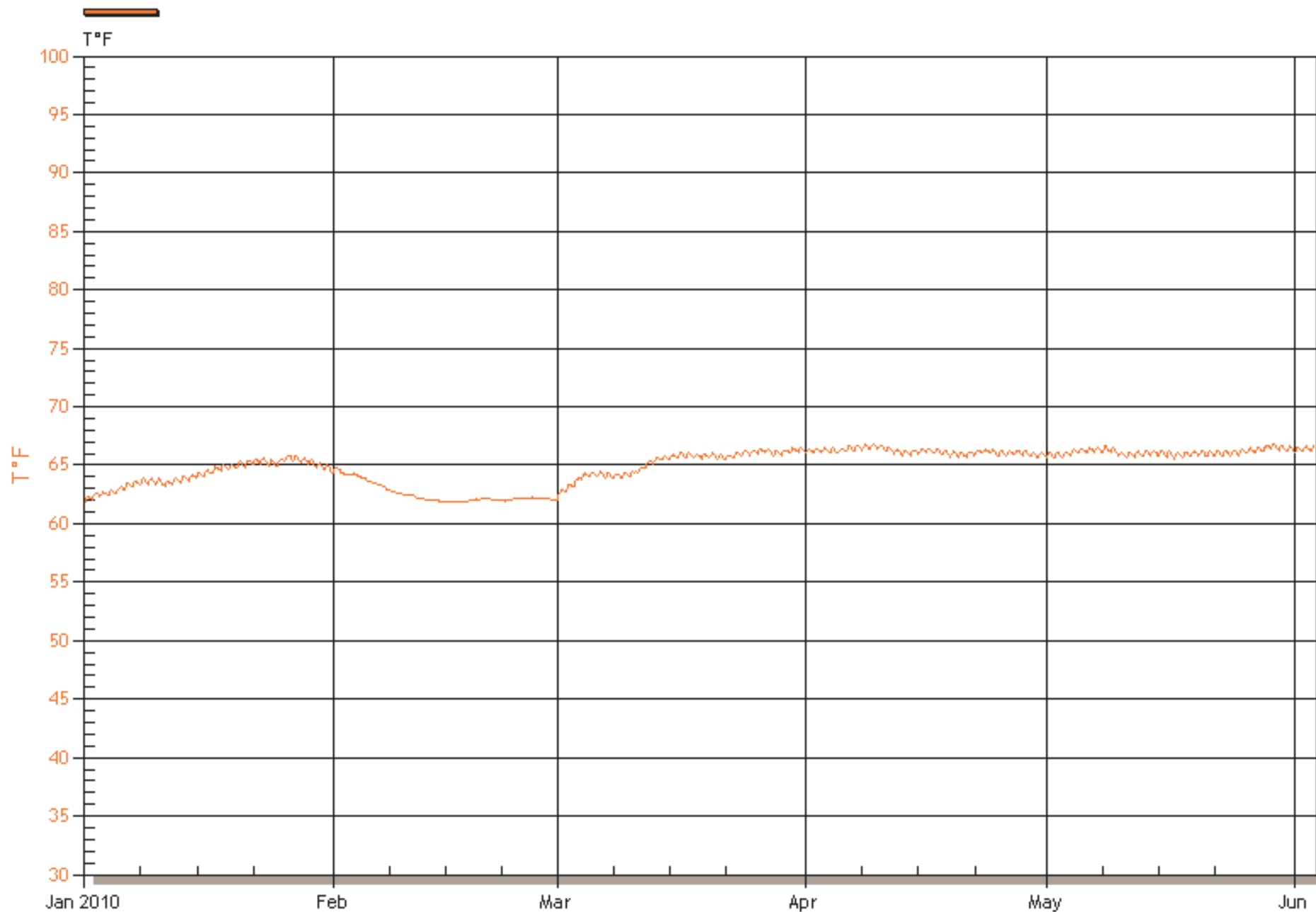
- IMLS funded
- Five Libraries
 - Yale
 - UCLA
 - Birmingham Public Library
 - NYPL
 - Cornell
- 3 Years

Research Premise

- HVAC systems can be completely shut down during unoccupied hours in selected spaces
 - Without compromising preservation quality
 - During much of the year
 - Providing risks to collections are measured and managed

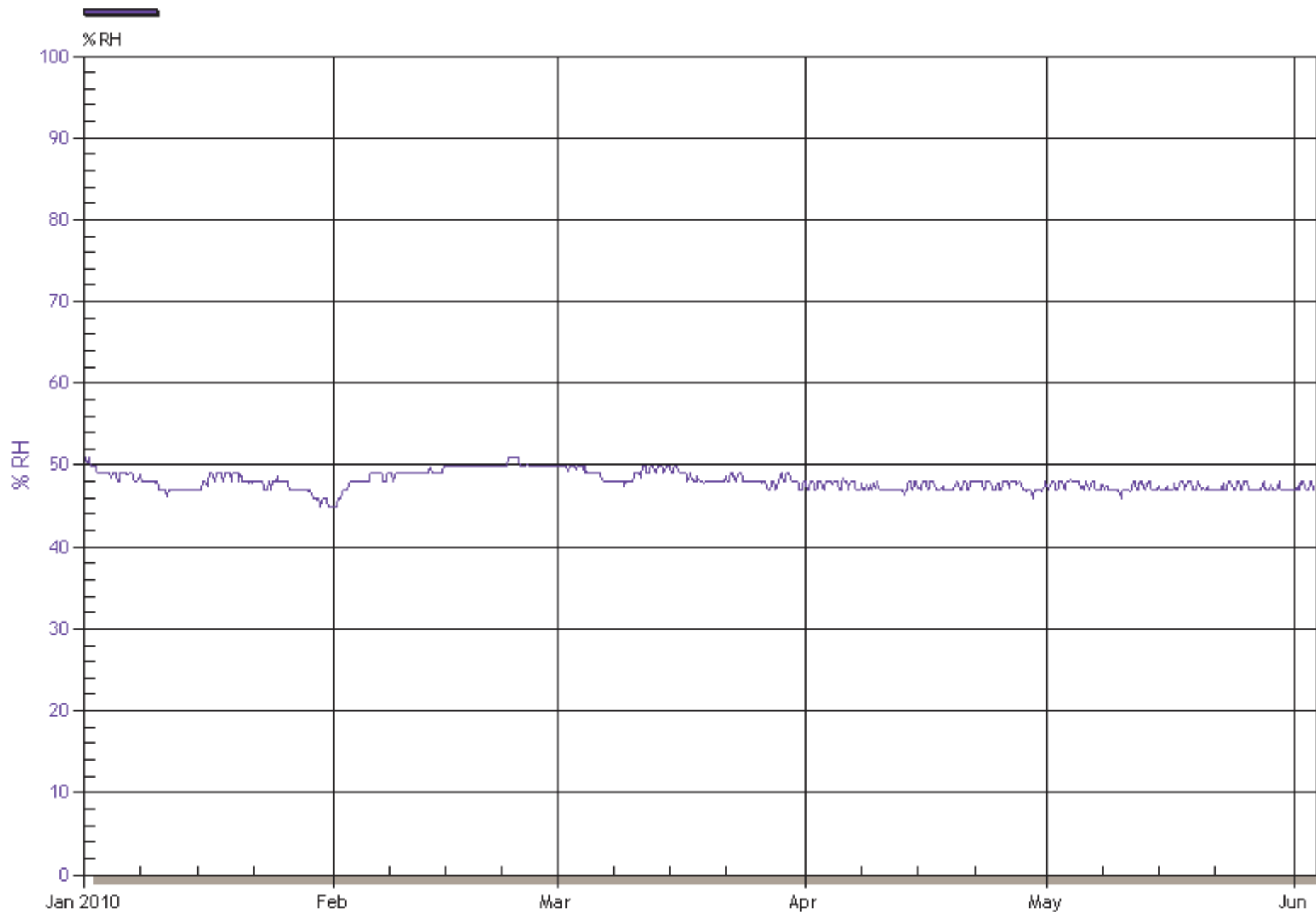
T°F of CALM LA 9S

2009-12-31 - 2010-06-03



% RH of CALM LA 9S

2009-12-31 - 2010-06-03



Project Elements

- Monitor in stack spaces
 - Ensure collections are OK
- Monitor in HVAC equipment
 - Measure energy
 - Verify shutdowns
- Track data on dedicated web site









Aggressive Shutdowns Research

- Mainly laboratory work
 - Exploring rate of temperature and RH equilibration of library and archive materials
 - Can undesirable (but very energy efficient) conditions be repeatedly tolerated for short intervals if they are not ‘felt’ by collections
- Field trial of aggressive setbacks in RIT library

Seminars on Sustainability

- 5 regional venues nationally during 2010 and 2011
 - IPI research team
 - Peter Herzog
- Practical
- Designed for both facilities and preservation professionals



Sustainable Preservation Practices

for managing storage environments

*Funded by the National Endowment for the Humanities Education & Training Grant Program
Presented by the Image Permanence Institute, Rochester Institute of Technology*

A no-cost series of regional workshops and webinars for collections care and facilities staff in cultural institutions

Two nationally known experts in preservation and energy management will present the workshops:

James Reilly, IPI Director

Peter Herzog, Principal, Herzog / Wheeler & Associates

Designed to enable collections care staff in cultural institutions to avoid risks to collections while they support sustainability efforts and pursue opportunities for energy cost reduction, the two-day workshops will introduce participants to:

- Recent developments in the tools and techniques for managing the storage environment in sustainable ways
- Basic mechanical system functions, the energy consuming elements of mechanical systems, and how to identify where responsible energy savings are possible
- A methodology for defining and achieving optimal and sustainable preservation storage climates
- Guidelines for risk management of changes in T and RH settings that affect collections
- How facilities and collection staff can best work together



Follow-up webinars will focus on the practical application of sustainable preservation practices in collecting institutions.

A no-cost series of regional workshops and webinars for collections care and facilities staff in cultural institutions



Follow-up regional webinars will go into detail about the challenges and opportunities provided by the local climate patterns and what they mean for institutional mechanical systems. These will be presented in December 2010, and January, March, May and June of 2011. Check the website for details.

Go to www.ipisustainability.org to sign up or to learn more about this series.

Pre-registration is strongly encouraged due to limited space per venue. There are no registration fees for the two-day workshops or the follow-up webinars. However, participants will have to pay their own travel expenses. All presentations are loaded with practical information and learning activities. IPI's Sustainable Preservation Practices handbook will be provided to all participants.

"IPI is the most innovative and leading organization addressing environmental needs for collections in the museum, library, and archival fields." - Lawrence L. Reger, President, Heritage Preservation

Who should attend?

- Facilities administrators and HVAC technicians interested in energy reduction and cost savings
- Collections care professionals
- Directors, curators and librarians

The process of optimizing typically yields 10-20% cost reduction using EXISTING equipment and systems

to sign up or learn more about this series, visit the project website:

www.ipisustainability.org



NATIONAL
ENDOWMENT
FOR THE
HUMANITIES

R·I·T

To Learn More...

- Visit IPI's web resources
 - Pemdata.org
 - DPCalc.org
- Sign up for IPI's informative e-newsletter, Climate Notes at:
 - Imagepermanenceinstitute.org

