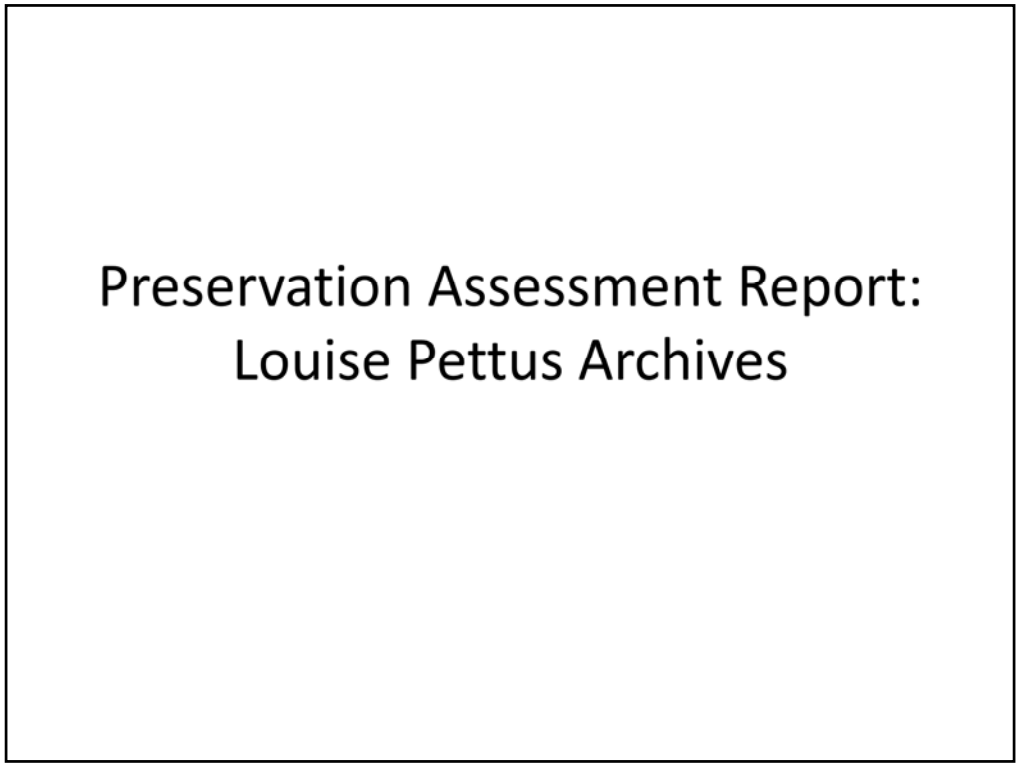
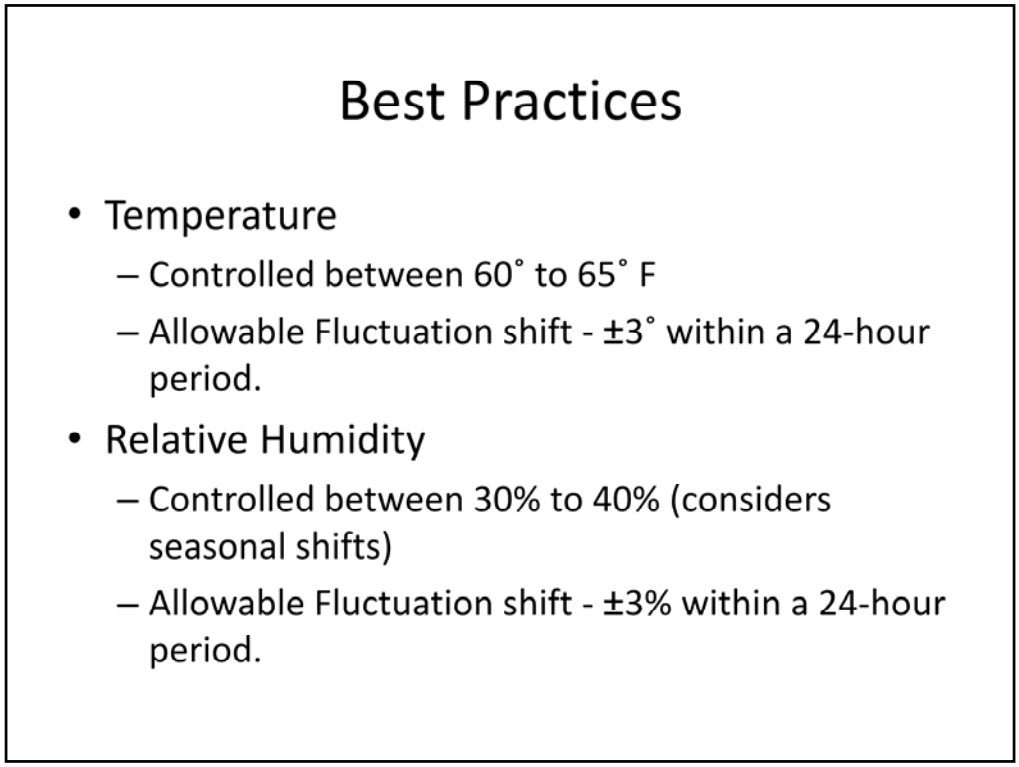


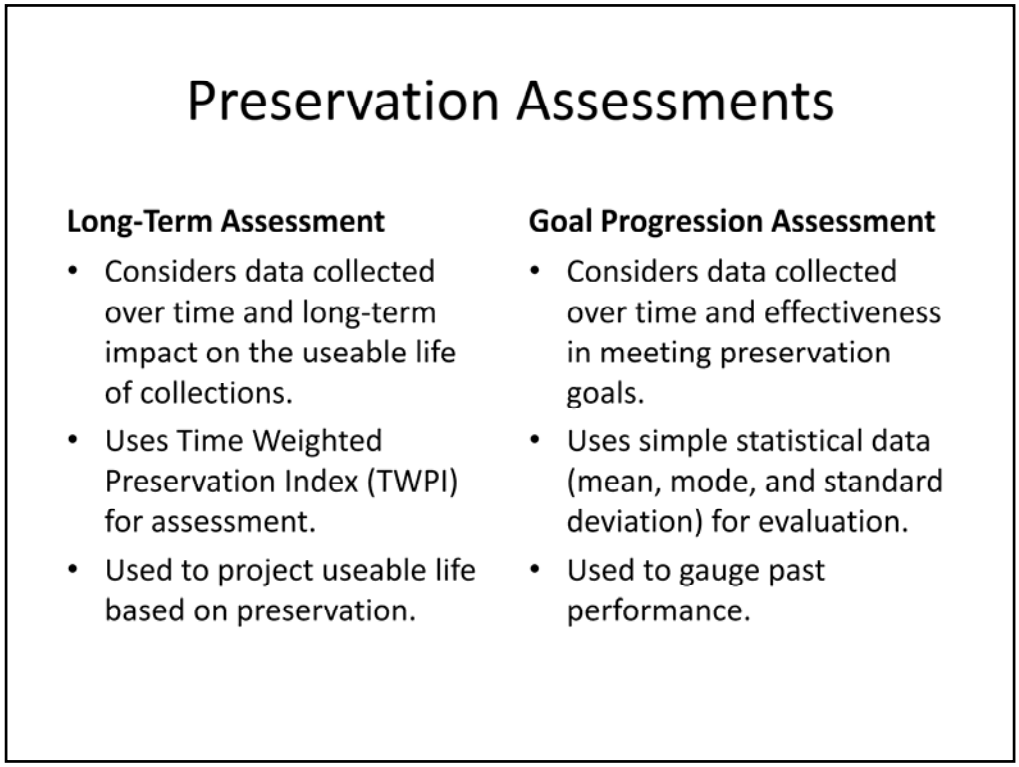
Slide #1 – [Title Slide – no content]



Slide #2 – Best Practices

The Dacus Library strives to maintain a comfortable environment for its patrons but normal room temperature and relative humidity levels are unacceptable for promoting long-term preservation of archival materials. Higher levels of heat and moisture create trigger factors that increase molecular activity and chemical reactions that lead to warping, brittleness, accelerated aging and decomposition of archival materials. This consequence impacts all archival material stored on paper, photographs, artworks, audio and videotape, and, electronic storage media, including hard disk and CD/DVD optical storage. Defined preservation goals are established and maintained because they are proactive and preventative measures designed to promote the long-term use of these materials.

The defined preservation goals for the Pettus Archives are to maintain temperature and relative humidity levels on a consistent basis between 60 to 65 degrees Fahrenheit and 30 to 40% relative humidity, respectively. A wider range of 30% to 40% throughout the year for relative humidity is allowed because seasonal shifts create control difficulties and most HVAC systems are designed to efficiently regulate temperature, not relative humidity. Maintaining these levels on a consistent basis is important because there is a correlation between rapid temperature and relative humidity shifts and accelerated aging. Consistency is defined as maintaining temperature and relative humidity fluctuations between 0 and 3 degrees Fahrenheit and 0 to 3% relative humidity within a 24-hour period. In other words, temperature and relative humidity levels are allowed to increase and decrease within their defined ranges as long as the change is moderate and is reflective of seasonal trends. If extreme temperature and relative humidity conditions persist, the long-term consequences are costly. The damage done to these unique archival materials is cumulative and irreversibly permanent.



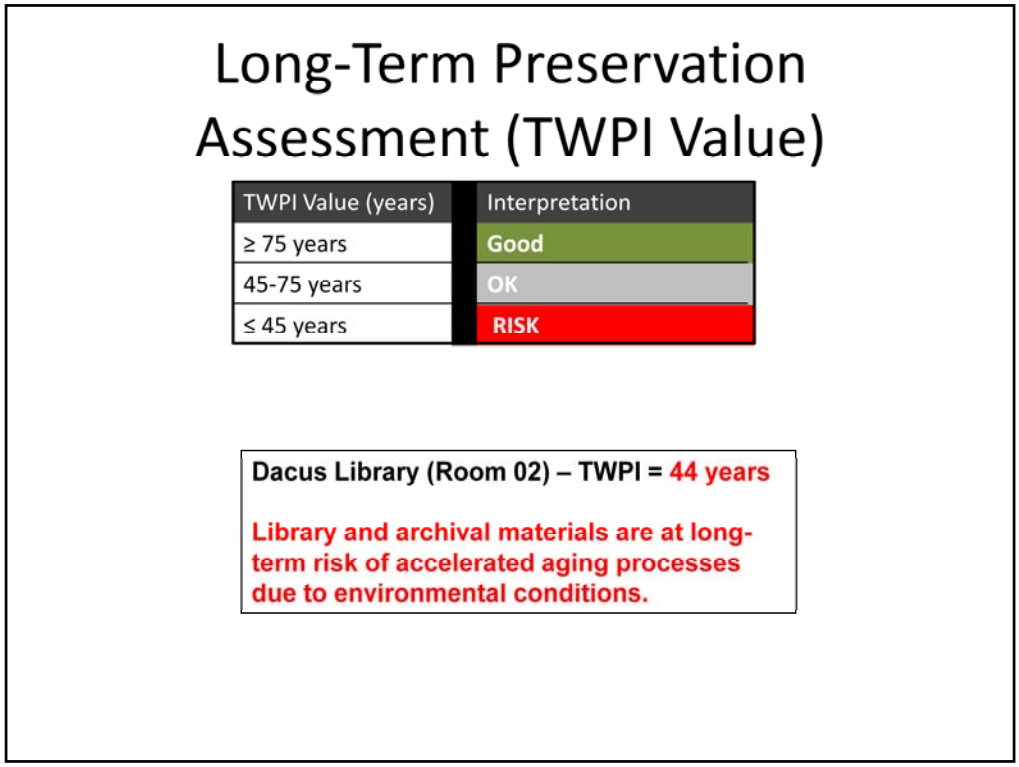
Slide #3 –Preservation Assessments

Beginning in August 2009, the archives staff initiated an ongoing assessment of the preservation environment using a data logger programmed to collect temperature and relative humidity data samples on an hourly basis. The data samples were compiled for two different types of assessments – the long-term assessment and the goal-progression assessment.

The long-term assessment determines the success or failure of preservation efforts by determining how past performance impacts future use of the collection by using a scientific algorithm known as the time weighted preservation index, or, TWPI, which provides an estimated useable life span of archival materials. The TWPI, developed by scientists at the Image Permanence Institute, Rochester Institute of Technology, was created specifically for this type of long-term assessment.

The goal progression assessment uses simple statistical data to evaluate how successfully preservation goals are being met over time. This type of assessment is similar to a performance evaluation with an emphasis on meeting specified preservation target ranges.

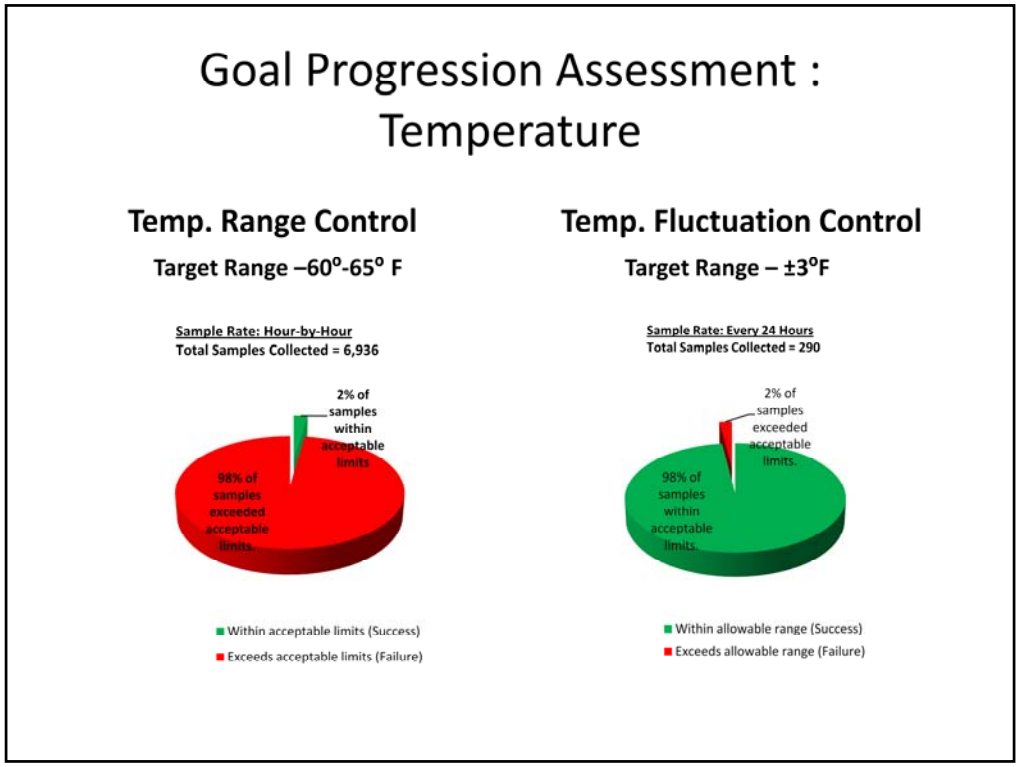
Both assessments consider archival material stored on paper, photographs, artworks, audio and videotape, and, electronic storage media, including hard disk and CD/DVD optical storage.



Slide #4 – Long-Term Preservation Assessment

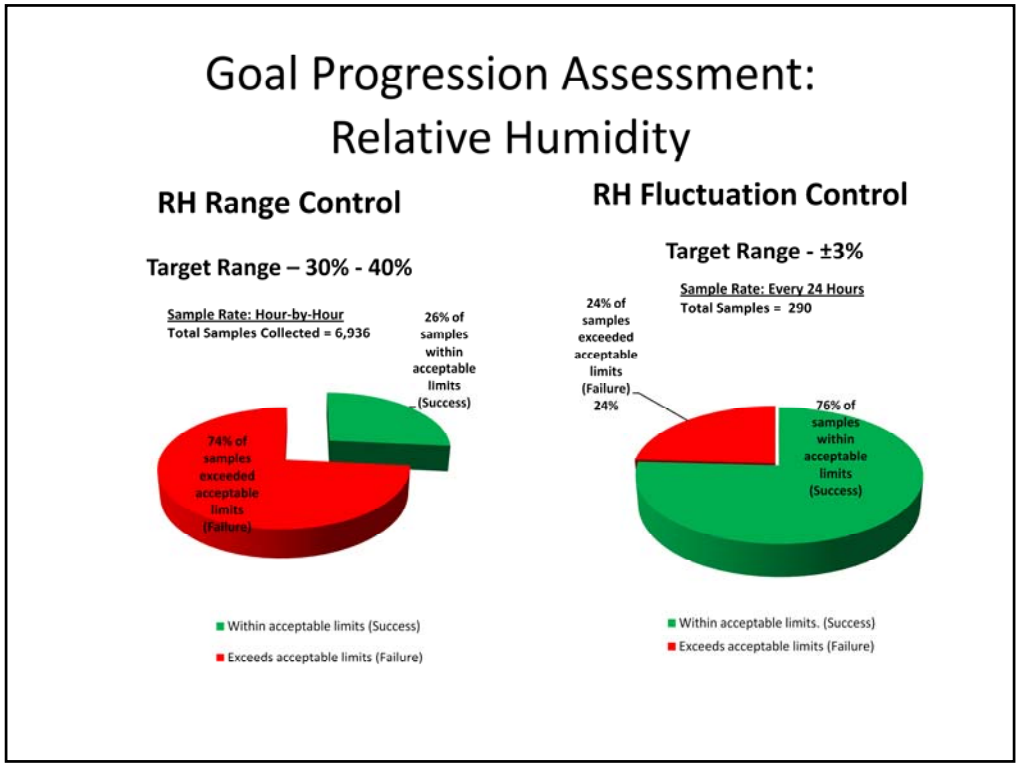
The cumulative temperature and relative humidity data from August 2009 to May 2010 was collected and analyzed using the TWPI algorithm. The analysis concluded that the archival collections are at risk due to premature aging and the TWPI Value, which estimates the useable life expectancy at **approximately 44 years**. The minimum range for a good TWPI Value is 75 years. In sum, the long-term assessment demonstrates overall failure to meet long-term preservation goals. Correcting this problem requires lowering temperature levels to a balanced level where overall stability of the environment remains consistent and without wild fluctuations.

In other words, there is an inverse relationship between controlling temperature within specified targets and the capability to maintain that range within moderate limits. In the American South, higher temperature ranges are more easily and consistently controlled over time, whereas, lower temperature ranges are more difficult to control on a controlled and consistent basis. A controlled and consistent basis is defined as the ability to maintain temperature within plus or minus 3 degrees Fahrenheit within a 24-hour period. The colored pie charts in the subsequent slides best illustrates this point.



Slide #5 – Goal Progression Assessment: Temperature

Note the two colored pie charts, side-by-side in this slide. For both charts, the color red represents failure and the color green represents success. The red colored pie slice in the chart on the left represents a 98% failure rate to control temperature within 60 to 65 degrees Fahrenheit. The green colored pie slice in the chart on the right represents a 98% success rate to maintain control of temperature fluctuations within a range of plus or minus 3 degrees Fahrenheit in a 24-hour period. Note the inverse relationship between the two. These findings suggest that more could be done to lower present temperature levels within the specified 60 to 65 degree Fahrenheit range. Moving forward with this goal would probably alter the system's ability to control fluctuations, but it is understood that this is a "trade-off" based on the design limitations of the present HVAC system. The long-term need here is to find a careful balance so that the TWPI value increases to an acceptable level. Lowering temperature levels represents a positive step forward to address that need. Complicating matters somewhat is the need to effectively control relative humidity levels.



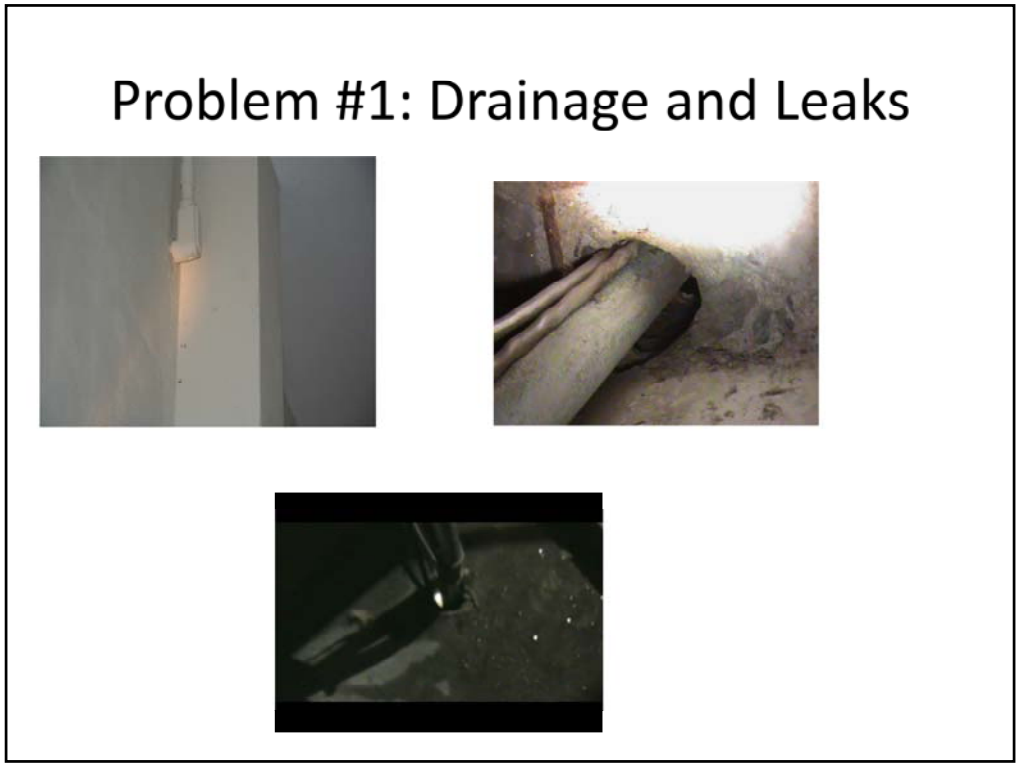
Slide #6 – Goal Progression Assessment: Relative Humidity

The two colored side-by-side pie charts on this slide reveal a similar pattern for relative humidity. The red colored pie slice in the chart on the left represents a 74% failure rate to control relative humidity levels within 30 to 40%. The green colored pie slice in the chart on the right represents a 76% success rate to maintain control of relative humidity fluctuations within a range of plus or minus 3% in a 24-hour period. Again, note the inverse relationship between the two. As noted for temperature, these findings suggest that more could be done to maintain relative humidity levels within the specified 30 to 40% range. And as was just noted for temperature control, there is an understood "trade-off" between controlling relative humidity within a specified range and maintaining control of RH fluctuations. The long-term need here is to find a careful balance so that adjusting relative humidity levels has a positive impact to increase the overall TWPI value to acceptable levels. This can be done by calibrating the existing HVAC so that it operates at peak efficiency within its design specifications so that there is a balance between target goals as closely as possible.

Unfortunately, most HVAC systems are designed to efficiently regulate and maintain temperature levels and there is little regard to regulating relative humidity levels. And using applied heat to reduce relative humidity levels compromises attempts to reduce temperature levels. This is probably the same system design for the Dacus Library's present HVAC system. But there are other complicating factors that deter the archive's long-term preservation needs.

Slide #7 – Other Complicating Factors

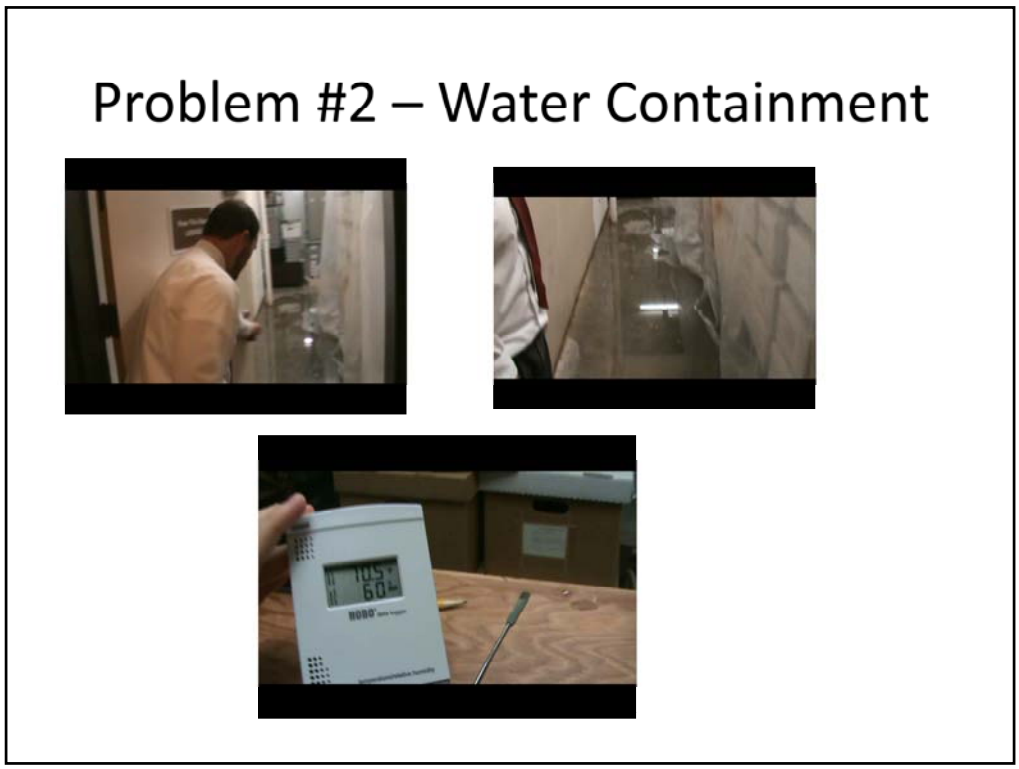
There are 3 known problems that complicate control of temperature and relative humidity efforts. These problems are ever-present drainage and leaks, water containment, and poor communication between the library and facilities regarding preventative maintenance routines and inspections. Addressing these known problems first is an essential step that needs to be taken to resolve these larger concerns.



Slide #8 – Problem #1: Drainage and Leaks

Drainage problems and leaks are a continuing problem in the emergency exit access basement area located outside of Room 02, the archives' primary archival storage area. The first picture on the left shows water leaking from a junction box in the emergency exit stairwell outside of Room 01 and Room 02. This picture was taken during late Monday morning on May 31st during a recent rainstorm that occurred throughout the day.

The picture on the right is a close-up photo of a 2 inch gap between power conduit and local area network drop. This gap begins on the 2nd floor HVAC room, continues through the main floor HVAC room located in technical services, and it runs through to the basement level where Room 02 storage is located. The picture on the bottom of the slide shows the gap from a different perspective. This photo image was captured on May 17th in the HVAC room on the main floor just above Room 02 following a flooding event. Note the light shining through the 2 inch gap for the hole containing the power conduit line and local area network drop. The whole is flush with the floor creating a drain for water. When flooding occurs, water containment becomes a serious issue as noted in the next slide.

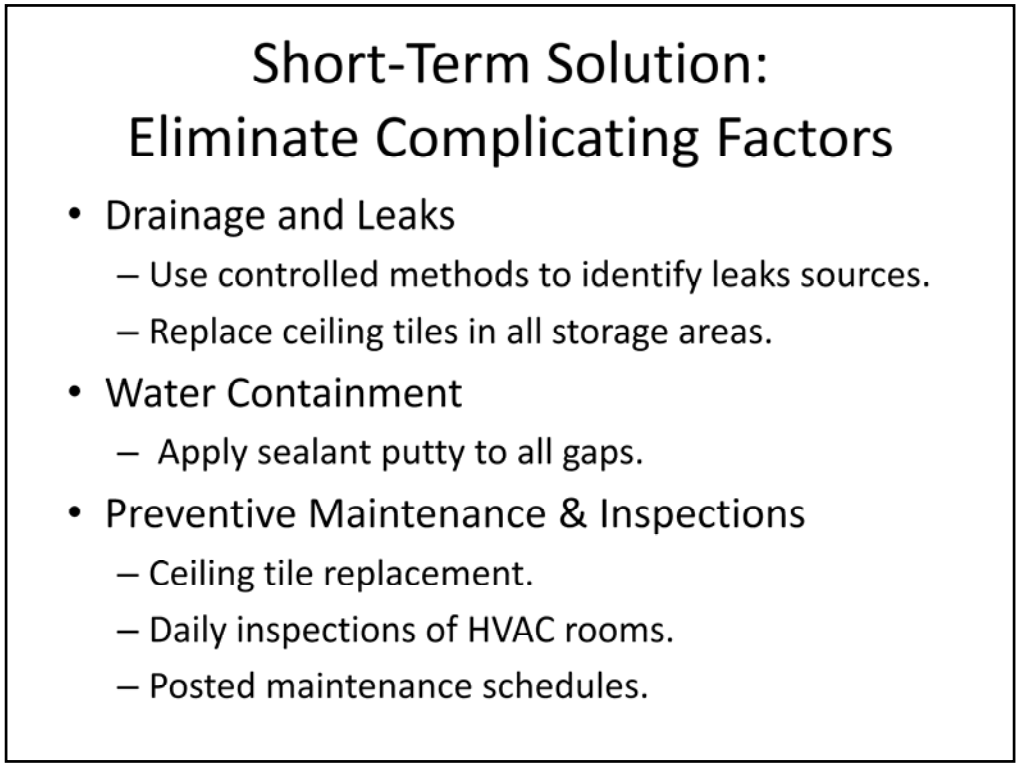


Slide #9 – Problem #2: Water Containment

The top images on the left and right were captured on May 17th in Room 02 following a flooding incident that was discovered the same day. Flooding occurred on the floor above and drained down into the basement level. These flooding events are extremely detrimental to preservation efforts for the materials stored in the basement. The captured image at the bottom is the archive's data logger that shows a temperature level of 70.5 degree Fahrenheit and 60% relative humidity. These levels far exceed preservation target goals and are at levels high enough to encourage active mold blooms to occur. Though some of these known problems may be anomalies, some of those problems may have been prevented.

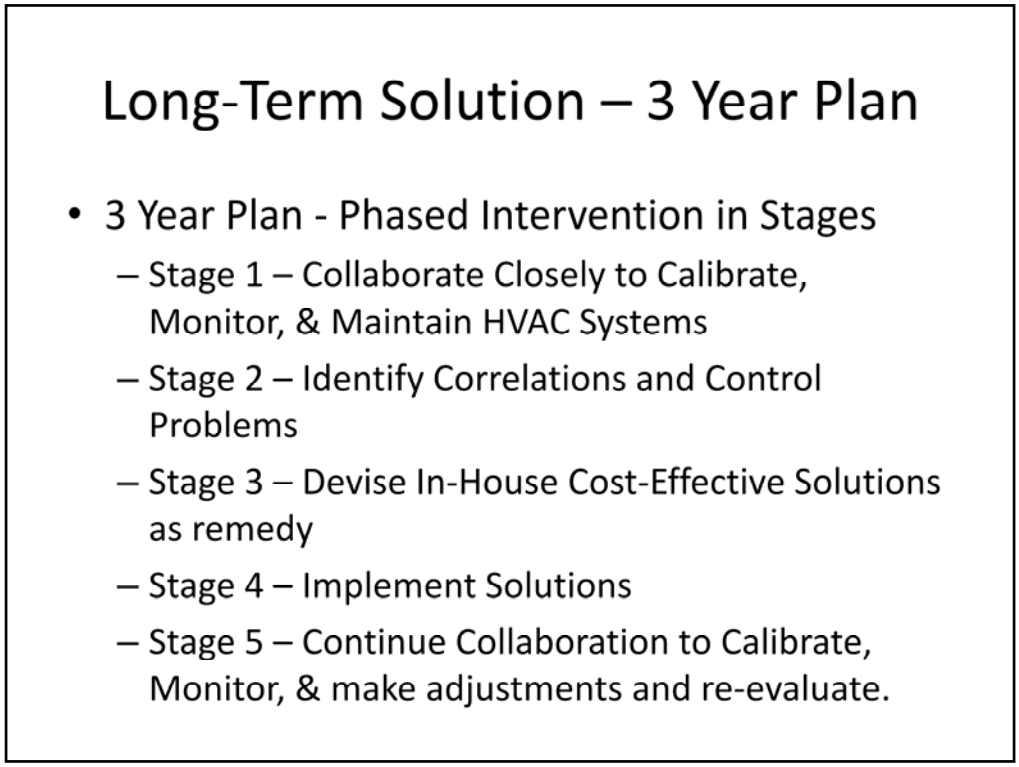
Slide #10 – Problem #3: Preventative Maintenance and Inspections

The image on the left is standing water resting on top of the HVAC unit housed in technical services. The image to the right is of 2 condensate drip pans. Was the water cleaned up or was it allowed to remain? Why are the condensate pans there? A dialogue of open communication between facilities and archives staff needs to be established on an ongoing basis so that preventable problems can be identified before they lead to bigger problems. Knowing when and what type of preventative maintenance routines provide the type of background information needed to identify known cause and effect relationships of temperature and relative humidity levels and fluctuations. Knowing when these events occur and how they affect the controlled environment helps archives staff to know precisely how and when temperature and relative humidity spikes or drops occur due to maintenance. Also, knowing that the HVAC systems throughout the building are maintained at peak operating efficiency provides archives staff with the assurance that these systems are performing to the best of their limitations to regulate temperature and relative humidity control.



Slide #11 – Short-Term Solution: Eliminate Complicating Factors

The resolution to these immediate factors is quite simple and cost effective. Using controlled methods to identify the source or sources of these leaks is a crucial first step. Once those leaks are identified, then the next step is to apply sealant putty to all known gaps so that water can be self-contained when flooding events occur. Also, ceiling tiles in Room 02 need to be replaced so that archives staff can identify if leaks continue. Ceiling tiles also act as a natural absorbent to prevent archival materials from being saturated by moisture and water. As a preventative measure, the HVAC rooms should be inspected on a daily basis to ensure that there aren't any flooding issues and so they can be reported immediately when they do occur. The burden of this task can be assigned to a designated library staff person. Also, the library should be notified about any maintenance scheduled for the HVAC units in the library so that they will know about the impact and temporary disruption that impacts the preservation environment. Correcting these known problems represents a first step toward a long-term solution to improve preservation standards in the archives.



Slide #12 – Long-Term Solution – 3 Year Plan

The long-term solution should be implemented over a three-year period at different stages. This slide is a skeletal outline of the different stages contained in the plan. The first stage requires calibration, monitoring, and maintenance of the existing HVAC systems within the Dacus Library to ensure that they are operating at optimum efficiency. Communication between archives and facilities staff is essential to accomplish this goal. Activities during the second stage require constant communication between facilities staff and archives staff to identify anomalies that occur when attempting to regulate temperature and relative humidity levels during periods when seasonal shifts are expected. Identifying these anomalies will also yield information about what type of system components need to be incorporated in the HVAC system so that there is better control. Stage 3 requires planning and budgeting for an in-house solution to improve and optimize HVAC system performance. This would include estimating the project costs for labor and equipment for system components such as humidistat controls, heating and chilling coils, etc. that would improve the overall performance of the system and promote better system control. Stage 4 is the implementation stage where system components are installed, calibrated, and monitored for effectiveness. This stage requires close communication between archives and facilities staff. And, the final stage requires ongoing assessments of the preservation environment and to continue calibrations and making adjustments as needed to facilitate better control.