Everything You Wanted to Know About

Storage Environment

...BUT WERE AFRAID TO ASK

Wisconsin Historical Records Advisory Board
Registers in Probate Association

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AFTER YOU READ THIS MANUAL YOU WILL:

- ☛ **Be able** to better assess and prevent security risks and the threats of fire and water.
- ☛ **Recognize** how seemingly harmless factors like light and heat will degrade and eventually destroy records.
- ☛ **Understand** the basic preservation needs of paper, microfilm, and computer records.
- ☛ **Be ready** to develop worthwhile improvements that are also budget-friendly.
- ☛ **Have** the tools to conduct a preliminary survey of your current storage conditions.

Introduction

Why We Created the Manual

Many of Wisconsin's historical records are cared for by dedicated individuals who never had the opportunity to learn about preservation. Registers in Probate, Clerks of Court, and other local government employees are responsible for records stored in an assortment of rooms and buildings including underground cellars, motor vehicle garages, and abandoned jail cells. To complicate matters even further, the records themselves exist in a variety of formats which have unique and potentially conflicting preservation needs.

How We Created the Manual

In 1997 the Wisconsin Historical Records Advisory Board (WHRAB) began working on the Best Practices Project. Funding for the project was provided by the National Historical Publications and Records Council (NHPRC) an affiliate of the National Archives and Records Administration (NARA).

The goal of the Best Practices Project is to help three partner organizations establish best practices for historical records care. In addition to the Registers in Probate Association (RIPA), the project worked with the Wisconsin Council for Local History and the Wisconsin Association of Public Librarians. The first step for all three partner groups was to appoint a taskforce from the ranks of its membership. Seven Registers and one State Court Records Officer volunteered to participate in the Registers taskforce. Peter Gottlieb (WHRAB Deputy Coordinator) and Sally Jacobs (Project Archivist) met with this group three times between March and November.

At the first meeting, members of the Registers taskforce decided that what they needed most was simple, concise information on the proper storage environments for court records. The taskforce met a few months later to examine and discuss preservation information published in journals, books, and on the World Wide Web. Following this discussion, the group outlined the contents of this manual. Jacobs and Gottlieb drafted a rough version of the manual, which was discussed at the third meeting, along with the structure and content of the workshop on storage environment.

The Best Practices Project was designed to become the property of the associations that helped to create it. After the initial workshop is presented by the Records Advisory Board representatives, the Registers in Probate Association will be able to put on additional workshops with the help of a curriculum packet.

Acknowledgments

We are grateful to the following Registers who donated so many hours to this project. It's no exaggeration to say that this manual would not have been possible without their input.

Registers in Probate Taskforce Participants:

Sally M. Lunde, Waukesha County Register in Probate - *Chair*
David Bubier, State Court Records Officer
Eyvonne Ebert, Menominee and Shawano County Register in Probate
Joy Legro-Pecha, Langlade County Register in Probate
Joan Maxwell, Columbia County Register in Probate
Carol Mills, Racine County Register in Probate
Susie Soukup, Marathon County Register in Probate
Jane Stetzer, Jefferson County Register in Probate

We also wish to thank Virginia Fritzsch (Local Government Records Archivist) and Sharlane Grant (Preservation Officer) from the State Historical Society.

Some Introductory Do's and Do Not's

ALWAYS AIM FOR THE IDEAL...

Ideal storage environments are the best way to make records last as long as possible. *Always* provide the ideal when you are able to; *never* settle for compromises when you can afford something better.

...BUT COMPROMISE WHEN YOU HAVE TO

We recognize that "state of the art" storage facilities are expensive.... more expensive, in fact, than most County Boards are ever likely to fund.

PRESERVE ONLY WHAT NEEDS TO LAST

Since preservation can be costly, it simply doesn't make sense to spend extra money and time preserving records that only need to be retained for 10 or 20 years. To help us communicate the difference without going into too much detail about specific types of records, the Registers in Probate task force came up with the following categories:

Short term - Retention period of 25 years or less.

Long term - Retention period of 26 to 100 years.

Permanent - Records with a retention over 100 years.

Includes truly permanent records such as adoptions.

Please keep in mind that these terms are for this manual only. They are *not* official categories. For a detailed list of retention schedules, please consult **SCR 72 - Retention of Court Records.**

Section 1:
How to Use the Manual, Section by Section

We know how difficult it can be to absorb a large amount of new information, especially when that information is highly technical. We attempted to use as little technical jargon as possible, but some terms were simply unavoidable. All of these terms are defined in sidebars and boxes that stand out from the rest of the manual.

Since parts of the manual build upon information in earlier sections, we recommend that you begin at the beginning and work your way through to the end. That sounds obvious, we know. But it's the only way to make sure you understand the big picture before you try to tackle the nitty gritty. Once you feel comfortable with the overview, you can dive in and inventory your records storage areas, analyze what you find, and make changes based on your conclusions.

SECTION 2: STORAGE ENVIRONMENT 101: *A Brief Overview*

This section is a basic overview of several factors that can threaten the life span of your records if not controlled. The list includes:

Light
Relative Humidity
Temperature
Pests
Dust, Dirt and Pollutants
Security; Fire and Water

You won't find solutions in this section, just a description of how various elements can reduce the usable life of records. Solutions can be found in Sections 3-7.

SECTION 3: SECURITY FROM THEFT, PROTECTION FROM FIRE & WATER

Theft, fire and water threaten *all* records regardless of the material on which they are recorded. Unlike later sections, Section 3 is not grouped by record format. This section includes recommendations for preventive steps, and also points you toward additional information on emergency preparedness and disaster recovery.

SECTIONS 4, 5 & 6: STORAGE GUIDELINES

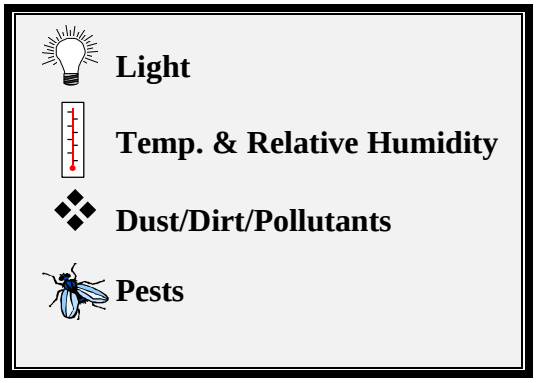
Environmental factors such as temperature impact differently on records that are made from different materials. Some storage requirements, therefore, will vary by type of material. The manual covers the following materials:

Section 4: *Paper*
Section 5: *Microfilm*
Section 6: *Computer Disks and Computer Tapes*

Sections 4-6 include a brief description of the physical and chemical makeup of a particular material and its expected lifespan. For each material, there is a single-page "at-a-glance" table that outlines ideal storage conditions, possible damage, and signs of damage.

SECTION 7: LOW COST / NO COST IMPROVEMENTS

Because budgets are limited, Section 7 includes ideas for low-cost (and in some cases no-cost) improvements. These suggestions are divided by type of storage area: mixed office/storage space, separate storage space in same building, and off-site storage space. Within each storage area, suggestions are further categorized by type of threat, each of which has a corresponding symbol:



SECTION 8: HOW TO ASSESS YOUR CURRENT STORAGE ENVIRONMENT *[SURVEY]*

Before you can improve your storage conditions, you need to make an assessment of your current storage environments. We have included a survey for you to use on each separate storage area.

THE APPENDICES

You can use the appendices to find names and phone numbers of professionals who can answer your questions about preservation. You can also find citations for books and articles that will give you more in-depth information on various topics.

Several members of the Registers taskforce raised concerns about how to handle a disaster such as a flood. Unfortunately an in-depth study of emergency management and disaster planning is beyond the scope of this manual. In an effort to get at least some information into Registers' hands, we included two technical leaflets from the Northeast Document Conservation Center (NEDCC).

Taskforce members also raised concerns about County Boards that see digitization as a cost-saving measure. While electronic records can make access easier, they are not a satisfactory preservation medium. Appendix C "The Digitization Bandwagon" was created to help Registers communicate their concerns to Board members.

Section 2:
STORAGE ENVIRONMENT 101 *A Brief Overview*

The environment in which records are stored plays a significant role in the survival of materials and the information they contain. A controlled environment can dramatically extend the usable life of historical records in your care.

Security

Part of your responsibility in caring for records is to ensure their safety, which includes protecting records from theft and tampering.

Fire and Water

In addition to the more obvious threats of fire and flood, you should be aware of the danger from excess heat, smoke, and small leaks.

Light

The full spectrum of light includes ultraviolet (UV), visible, and infrared. Both sunlight and fluorescent lights include UV rays, which are invisible to the naked eye. Of all the different types of light, UV rays are most active in causing fading and physical deterioration of records. Infrared light damages records by the heat it generates.

Relative Humidity (RH)

Relative Humidity is a complicated ratio that involves water vapor, temperature, and pressure. All you need to understand is that relative humidity is dependent upon temperature, and therefore the two factors need to be considered together. Even though temperature is easier and less expensive to control, humidity levels should have first priority. Fluctuating humidity levels can cause records and their containers to expand and contract, causing wear and tear on the materials. High humidity levels also encourage mold growth and offer an ideal environment for insects.

Temperature

High temperatures increase the rate of chemical reactions, and many types of deterioration are caused by chemical reactions. Here's a sobering fact: the rate of most chemical reactions, including deterioration, is approximately doubled with each increase in temperature of 18 degrees F.

Pests

Insects and rodents eat cellulose (a common ingredient in paper), starch, glue, and gelatin. Cockroaches will eat electronic components. Rats, mice, and squirrels can literally eat records, and their droppings will leave permanent stains. Pests also create health risks in the work environment. Live plants, flowers, food waste and water can encourage all types of pests.

Dust, Dirt, and Pollutants

Dust and dirt darken and eventually disfigure paper records. They can also scratch microfilm and make computer tapes unreadable. Airborne pollutants such as ozone and sulfur dioxide create chemical reactions that degrade materials such as paper, film, and tape.

General Guidelines for Preventing Storage Problems

One of the most important steps is to stabilize the RH and temperature in storage areas. This means stable not only within a single day, but also from season to season. Never store records in an unheated building such as a barn or storage shed. If necessary, it's OK to let the temperature slowly rise or fall as the seasons change. If it's done deliberately and carefully it's better than throwing open the windows on the first warm Spring day.

MACRO VS. MICRO ENVIRONMENTS

Big Words - Simple Concept

Controlling the RH and temperature of large spaces can be difficult, but there are factors that may make your job easier. For each storage area, imagine that there are actually *two separate* areas: the *macro*-environment and *micro*-environment.

The macro-environment includes the temperature, relative humidity, light levels, and air quality of an entire *building* or a *room*. Areas this large are difficult (and therefore expensive) to control.

The micro-environment is an area that you create by enclosing records in smaller units. For example, a portable dehumidifier can create a room-sized micro-environment within a building. Similarly, good quality boxes can create a small micro-environment within a room. A box-sized micro-environment would serve as a buffer against light, dust, pests and extremes of temperature and RH.

A Cautionary Note: While micro-environments can isolate records from harmful elements like UV rays, they can also trap some threats inside with your records, such as pests.

Section 3: Security, Fire & Water

Security

Don't allow strangers into records storage areas. Records storage areas should be locked and have separate keys from the rest of the building. Keep keys in a secure area where no one can simply pick them up and walk away.

EMERGENCY PREPAREDNESS

Don't wait until disaster strikes to come up with a plan of action. Take the time **now** to draft a written disaster plan for the records in your care. *See Appendix B for suggested readings, and Appendix E for a disaster plan checklist.*

NEDCC's 24-Hour Hotline: (978) 470-1010

Thanks to a grant from the National Endowment for the Humanities, the Northeast Document Conservation Center offers **free advice** on dealing with damaged paper-based records.

Fire and Water

Fire or water could destroy all of your records in very little time. Precautions such as those listed below are critical, but it's just as important to know what to do when and if the worst happens.

Here are some practical guidelines that you can implement immediately:

- ➤ Read the Technical Leaflets on disaster preparedness in Appendices D and E.
- ➤ Keep an eye out for leaks, drips, and stains that may indicate previous water damage. Do not store records in rooms which are susceptible to water seepage, flooding, or leaks.
- ➤ Store records away from water pipes and combustible materials.
- ➤ Don't store records directly underneath sprinklers or along walls that have condensation.*
- ➤ Store records at least 5 inches off the floor, especially when the storage area is a basement. Use plastic pallets which will not absorb water and "carry" it to the records themselves.
- ➤ Have plastic sheeting on hand to cover files, boxes, and ledgers in case of leaks.
- ➤ Purchase an alarm that will sound when water is detected.
- ➤ Report all problems immediately to the building supervisor.
- ➤ A smoke detector that provides adequate early warning of fire should be installed in the records room. The system should have an alarm that is hooked directly to the Fire Department or the clerk's office.*
- ➤ An automatic fire extinguishing system should be installed in the records room. If a water sprinkler system is used, it must be carefully installed since the damage resulting from a sprinkler discharge could be greater than fire damage. The sprinklers should be rated at 250 to 286 degrees F to allow time for the fire to be extinguished with minimal water damage, and each sprinkler head should discharge independently to extinguish a localized fire without discharging the whole sprinkler system.*
- ➤ Keep an "ear out" for strange noises coming from photocopiers, air-conditioning units, fans, dehumidifiers, and other office machines - it may be a sign of overheating.
- ➤ Keep records away from radiators - they can get hot enough to cause a fire.

* Quoted from the **Wisconsin Model Court Recordkeeping Manual**: *Section 1, General Standards*. (17.1-17.2)

PAPER	Ideal Storage Conditions	The Threat *Possible Damage*	Signs of Damage *What to Look For*
Light **(Including UV Rays)**	**As little as possible.** Long-term exposure to dim light is just as damaging as a brief exposure to intense light.	UV light will fade inks and colored paper, and darken white paper. It speeds up chemical breakdown of paper. Damage from light is cumulative, and continues to affect paper even after light is blocked.	Faded ink, colored paper that has become faded or "bleached," white paper that has darkened.
Relative Humidity (RH)	**40% - 50% RH** *Within this range, a **stable RH** level is more important than any specific RH level.*	**High RH** (above 65%) causes paper to warp, encourages pests, and allows mold to grow. **Low RH** (below 30%) causes paper to dry out, and become brittle.	Signs of damage include: - Warped paper - Mold *(brown, black, or green spots sometimes accompanied by a musty smell)* - Insects and Pests *(see below)*
Temperature	**Storage: 60° - 65° F** **Office: 65° - 70° F** *Within this range, a **stable temp.** is more important than any given temperature.*	Heat increases the rate of deterioration. *Chemical reactions approximately double for each increase of 18° F.*	
Insects and Pests	**Pest and Insect free.** There should be no food or plant material near records. Make sure cleaning staff know what to look for.	Paper can be consumed, literally. May also be a sign of other problems such as high RH or poor housekeeping.	Pests: Holes or gnawed sections, droppings, the critters themselves. Insects: wings, carcasses, or very small droppings. Check window sills, too.
Dust, Dirt & Pollutants	**Clean & Free of Dust** **Good Air Circulation.** When possible, materials should be stored in archival quality folders and closed boxes.	Dust and dirt darken and eventually disfigure records. Airborne pollutants such as ozone and sulfur dioxide create chemical reactions that increase the acidity of paper. (See below)	Dust and dirt can be spotted with the naked eye. Airborne contaminants are not visible, but can cause paper to become yellow around the edges.
Special Needs	**Acidic Paper** - Acidic paper that becomes brittle cannot be restored or strengthened. The information must be photocopied onto archival quality paper or microfilmed in order to be saved. **Acidic Migration** - Acidity can transfer from one piece of paper to another, whether the paper is a sheet, an envelope, a folder or a box. Have you ever found an old newspaper clipping that's been in contact with white paper for a while? What you will see is a yellowish-brown stain on the paper that is the same size as the clipping. That's an example of acid migration.		

Section 4: PAPER

Remember to consult Section 3 for information about **SECURITY, FIRE, AND WATER.**

The Structure of Paper

Paper is made by suspending plant fibers (such as cotton or wood) in water and pouring this "slurry" over a fine screen. Various methods are employed to squeeze out the water, and what remains is a sheet of paper.

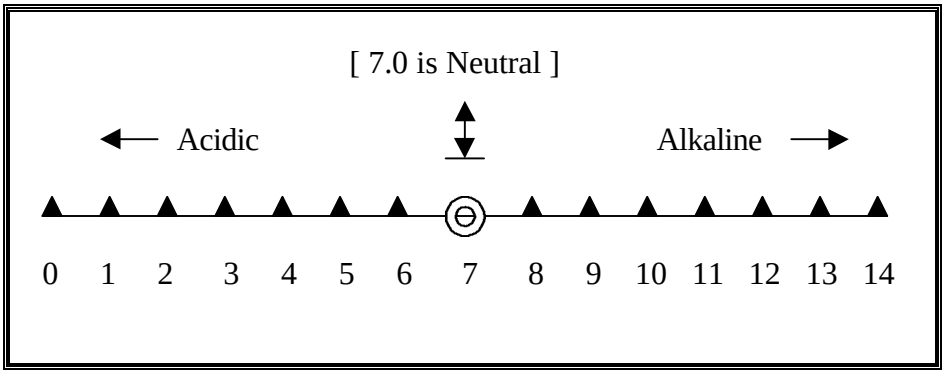
Expected Lifespan of Paper

The longevity of paper varies according to several factors, including fluctuations in temperature and relative humidity. One of the most critical factors, however, is the ingredients used in the manufacturing process. Beginning in 1850, acidic ingredients such as wood pulp and chemical bleaches became more common in paper manufacturing. As the acidity of paper increased, its lifespan declined dramatically. Government records that have been printed on acidic paper will eventually become brittle, thus limiting their useful life. High quality permanent paper *(see next page for definition)* may last for hundreds of years under good storage conditions.

The Acidic Paper Problem

Most paper deterioration is caused by acidification. Acidification is catalyzed by heat and intensified by relative humidity, light, and air pollution. Acidic paper that becomes brittle cannot be restored or strengthened. The information must be photocopied onto high quality paper or microfilmed in order to be saved. Good paper lasts longer than poor paper, period!

A QUICK REMINDER OF WHAT THE PH SCALE LOOKS LIKE



To make things even more complicated, acidity can transfer from one piece of paper to another. This transfer can happen whether the paper is a sheet, an envelope, a folder or a box. Have you ever found an old newspaper clipping that's been in contact with white paper for a while? What you will see is a yellowish-brown stain on the paper that is the same size as the clipping. That stain is an example of *acid migration* — and also serves as a vivid reminder of why long-term and permanent records should be housed in acid-free folders and boxes whenever possible.

Permanent Paper

In 1990, Congress passed Public Law 101-423 which states that federal records and publications of "enduring value" should be produced on permanent paper as a matter of public policy. The law urges state and local governments to follow suit. Unfortunately, a policy urging the use of permanent paper can be in direct conflict with existing policies regarding the use of recycled paper. Currently, no manufacturer offers permanent paper that also contains recycled materials.

One possible compromise is to use different paper for different types of records. Routine administrative work and records with short-term retention periods could be printed on recycled paper, while records that need to last for longer periods of time could be recorded on the more expensive permanent paper.

You may want to discuss the availability and cost of various acid-free and /or alkaline paper products with your current paper vendor. The catalogs listed in Appendix A are another possible source.

Testing the Paper You Already Have

There are several types of pens available that will test the pH of dry paper. Most pH pens cost $5.00 or less. Again, please consult the catalogs listed in Appendix A for more information.

MICROFILM	Ideal Storage Conditions	The Threat *Possible Damage*	Signs of Damage *What to Look For*
Light	**As little as possible.**	Light can create heat which increases the rate of chemical reactions.	
Relative Humidity (RH)	**No higher than 40% RH** *Changes should not exceed 5% in a 24-hour period.* Security copies of microfilmed permanent records should be stored in a climate-controlled film vault.	High RH encourages pests, and allows mold to grow. Can contribute to the problem of "*redox*" (see below).	Signs of damage include: - Mold *(brown, black, or green spots sometimes accompanied by a musty smell)* - Insects and Pests *(see below)*
Temperature	**60° - 65° F** *Changes should not exceed 5° in a 24-hour period.*	Heat increases the overall rate of deterioration. *Chemical reactions approximately double for each increase of 18° F.*	
Insects and Pests	**Pest and Insect free.** There should be no food or plant material near records. Make sure cleaning staff know what to look for.	May be a sign of other problems such as high RH or poor housekeeping.	Pests: Holes or gnawed sections, droppings, the critters themselves. Insects: wings, carcasses, or very small droppings. Check window sills, too.
Dust, Dirt & Pollutants	**Clean & Free of Dust** **Good Air Circulation.** Rolls of film should be stored in archival quality boxes to keep out dust.	Dust and dirt can scratch the film emulsion and make it difficult or impossible to read in sections.	Dust and dirt can be spotted with the naked eye. Scratches on film.
Special Needs	**"Redox" Redox** (sometimes called "measles") is a corrosion similar to rust that can occur on microfilm. Oxidation causes spots which can block text and make the film unreadable. Poor quality containers, air pollution, and high humidity levels can all encourage redox. **"Vinegar Syndrome"** This syndrome get its name from the sharp vinegar odor that is produced when film degrades. Acetic acid, which causes the odor, is a byproduct of the chemical deterioration of cellulose acetate film. This deterioration also causes film to shrink and become brittle.		

Section 5: MICROFILM

Remember to consult Section 3 for information about **SECURITY, FIRE, AND WATER.**

Records are microfilmed for a variety of reasons. Filming can reduce the amount of storage space needed for a particular group of records while preserving the information contained in those records. Filming can also reduce handling of fragile original records. Microfilm can provide a "back up" security copy of important records, since at least two copies are always produced: a master security copy and a reference (or "use") copy.

A WARNING ABOUT "REDOX"

Redox (sometimes called "measles") is a corrosion similar to rust that can occur on microfilm. Oxidation causes spots which can block text and make the film unreadable. Poor quality containers, air pollution, and high humidity levels can all encourage **redox**.

What You Can Do

- ✓ Toning treatments that inoculate silver films against oxidative attack are available. This process *cannot reverse* existing damage, but can prevent an outbreak on new film or unaffected older film.
- ✓ Store all security microfilm on non-corrosive reels and in high quality acid-free containers.
- ✓ Keep humidity levels and temperature stable.
- ✓ Including a long leader on microfilm reels will buy some time before spotting reaches the recorded information.

REMEMBER: *In order to prevent a total loss, security copies should be stored in a facility at least one block away from the reference/use copies.*

The Structure of Microfilm

Microfilm consists of thin strips of transparent material (such as polyester or acetate) coated with a light-sensitive emulsion.

Expected Lifespan of Microfilm

If properly processed and stored, black-and-white silver gelatin microfilm can last as long as 500 years. Although beyond the scope of this manual, proper filming techniques are an important aspect of the longevity of microfilm. For current Wisconsin standards, please refer to the technical standards for filming in the Court Records Management Manual.

A WARNING ABOUT "VINEGAR SYNDROME"

This syndrome gets its name from the sharp vinegar odor that is produced when film degrades. Acetic acid, which causes the odor, is a byproduct of the chemical deterioration of cellulose acetate film. This deterioration also causes film to shrink and become brittle.

What You Can Do

Once film starts to go, it happens *very quickly*. There are test strips available from the Image Permanence Institute (IPI) which will give you an idea of how much time the film has. See Appendix A for ordering information.

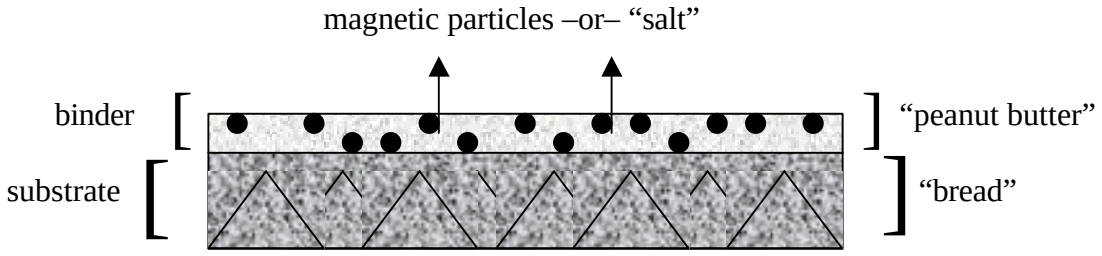
COMPUTER Disks & Tapes	**Ideal Storage Conditions**	**The Threat** *Possible Damage*	**Signs of Damage** *What to Look For*
Light	**As little as possible.** Long-term exposure to dim light is just as damaging as a brief exposure to intense light.	Infrared rays can create heat which increases the rate of chemical reactions.	
Relative Humidity (RH)	**40% - 50% RH** ***Within this range, a stable RH is more important than any specific RH level.*	High RH (over 50%) causes binder to degrade. RH over 65% encourages pests and allows mold to grow. Low RH (below 25%) causes tapes to become brittle.	Signs of damage include: - Mold *(brown, black, or green spots sometimes accompanied by a musty smell)* - Insects and Pests *(see below)*
Temperature	**Storage: 60° - 65° F** **Office: 65° - 70° F** ***Within this range, a stable temp. is more important than any given temperature.*	Heat increases the rate of deterioration. *Chemical reactions approximately double for each increase of 18° F.*	
Insects and Pests	**Pest and Insect free.** There should be no food or plant material near records. Make sure cleaning staff know what to look for.	Tapes can be consumed, literally. May also be a sign of other problems such as warm temperatures, high RH, or inadequate housekeeping.	Pests: Holes or gnawed sections, droppings, the critters themselves. Insects: wings, carcasses, or very small droppings. Check window sills, too.
Dust, Dirt & Pollutants	**Clean & Free of Dust** **Good Air Circulation.** Air conditioning is mandatory for keeping out dust. Store tapes vertically in canisters, and store disks in boxes.	Dust and dirt can scratch away magnetic particles and make tapes and disks unreadable.	
Special Needs	Keep all magnetic media away from static charges and magnets of any kind. Do not attach paper clips or rubber bands to floppy disks, and never touch the recording surface. Do not allow disks or their containers to lean or slant. Do not attempt to erase labels; remove and replace. Tapes in storage should be rewound periodically (at least once every 3.5 years) INSPECT TAPES ANNUALLY: visual inspection of housing, playback a few tapes to check if info. is still accessible.		

Section 6: COMPUTER DISKS and TAPES

Remember to consult Section 3 for information about **SECURITY, FIRE, AND WATER.**

The Structure of Computer Disks and Tapes

Computer tapes are a form of **"magnetic media."** Other examples you are probably familiar with include VHS tapes and audio cassettes. Magnetic materials are made up of *magnetic particles* suspended in a *binder* which is then coated onto a *film substrate*. It's much easier to picture the layers as a piece of bread (the *substrate*) with a layer of peanut butter (the *binder*) and then a sprinkling of salt (the *magnetic particles*). Information is encoded by magnetizing the particles.



Computer tapes and computer disks (also called floppy disks) are vulnerable to similar types of damage. Access to the recorded information can become impossible if there is damage to the particles, binder, or substrate. Heat may cause the plastic film of the tape to distort, and high relative humidity can degrade the binder and encourage mold to grow. Dust, dirt, and pollutants can cause potentially irreversible loss of information.

Expected Lifespan of Computer Disks and Tapes

There are simply no guarantees when it comes to predicting the lifespan of magnetic media. Longevity depends upon a combination of the circumstances and materials used in manufacturing process, the care and handling while in use and in storage, and its age. According to the National Technology Alliance, tapes and disks can be expected to last between 10 and 30 years. It's clear that even under the best conditions this medium cannot serve as a permanent storage solution.

See Appendix C: "The Digitization Bandwagon" for a discussion of the advantages and hidden costs of converting records to electronic or optical disk formats.

Low Cost / No Cost Improvements: Light

Mixed Office/Storage Space *"People Areas"*	Separate Room/Same Building *"Vault"*	Off-Site Storage Area
Do Not's Don't leave records with permanent value in the light for longer than necessary. **Do's** Consider using fewer light fixtures and/or bulbs with smaller wattage. Keep curtains and/or shades drawn as often as possible. Store records in boxes with lids or in closed drawers when feasible. If records are continuously exposed to light, invest in UV filters for light fixtures and windows. UV filters lose their effectiveness over time, and must be changed every 3-5 years. *(See the list of archival supply catalogs in Appendix C).*	**These suggestions are the same as the ones in the column to the left, but since no one works in these areas, you can demand more restrictive measures.** **Do's** Keep lights off except when retrieving records. Post "Lights Off" reminder signs. Block sunlight by painting windows, installing opaque "blackout" curtains, or covering with wallboard. Consider adding automatic timers to lights, so that they stay on for a set amount of time whenever turned on. Store records in boxes with lids whenever feasible.	*Same as column to the left.*

Low Cost / No Cost Improvements: Temp. & Relative Humidity

Mixed Office/Storage Space *"People Areas"*	**Separate Room/Same Building** *"Vault"*	**Off-Site Storage Area**
Do Not's Do not set back the heat or A/C during the evening or on weekends. We cannot stress this enough. Humidifiers are problematic, and generally should not be used. **Do's** Keep the temperature and RH **as stable as possible**. Weatherproof windows and doors. Keep outside doors and windows closed at all times. This will help to keep untreated air out of the room. Apply weatherstripping to doors and windows.	**These suggestions are the same as the ones in the column to the left, but since no one works in these areas, you can demand more restrictive measures.** **Do Not's** *Never* open a window in a storage-only area. **Do's** Try to keep the temperature around 60 degrees (although temperatures up to 70 degrees are acceptable). ***If the storage area is damp:*** Invest in some portable fans to improve air circulation. *This low cost addition will help to reduce the risk of a mold outbreak, but you must leave the fans on 24 hours per day.* You might want to buy a **portable dehumidifier**. *Again, you must leave it on all the time because fluctuating humidity levels can be more damaging than a constant high humidity level.* **Best solution:** Attach a hose that will automatically drain the water. This will prevent the machine from shutting off automatically when full, and you will spend less time emptying the water pan.	*Same as column to the left.* **Plus:** Never store records in unheated buildings such as barns or sheds.

Low Cost / No Cost Improvements: Insects & Pests

Mixed Office/Storage Space *"People Areas"*	Separate Room/Same Building *"Vault"*	Off-Site Storage Area
Do Not's No plants, No eating, No drinking NEAR RECORDS! Don't leave windows or outside doors open. **Do's** Practice regular housekeeping. Remove food waste from adjacent "people areas" every day. Use insect traps to find out if you have pests.	**These suggestions are the same as the ones in the column to the left, but since no one works in these areas, you can demand more restrictive measures.** **Do Not's** Never allow food or water in storage-only areas. Use insect traps to find out if you have pests. **Do's** Inactive records should be stored in archival quality folders and boxes whenever possible.	*Same as column to the left.* **Plus:** Make sure that every new storage site is pest-free before transferring any records.

Low Cost / No Cost Improvements: ❖ Dust, Dirt, and Pollutants

Mixed Office/Storage Space *"People Areas"*	**Separate Room/Same Building** *"Vault"*	**Off-Site Storage Area**
Do Not's ❖ Smoking prohibition should be enforced in the records room and in the surrounding area. (WMCRM section 1.17.2.c) ❖ Don't store records near photocopiers, which produce ozone and dust from toner. ❖ Basically, don't give critters a way into the building, and don't encourage them by leaving food or water around. **Do's** ❖ Practice regular housekeeping. ❖ Damp-mop or vacuum floors at least once a week, more often if possible. ❖ Dust shelves and storage boxes as often as possible or when necessary. ❖ Pay extra attention to dusting open folders, be sure to remove dust before you warehouse inactive records into boxes. ❖ Change furnace and A/C filters on a regular basis (monthly).	**These suggestions are the same as the ones in the column to the left, but since no one works in these areas, you can demand more restrictive measures.** **Plus:** Make sure cleaning crews don't skip these areas.	*Same as column to the left.* **Plus:** It might be more difficult to schedule regular cleaning, but it's just as important.

Section 9:
ASSESSING YOUR CURRENT STORAGE ENVIRONMENT

Until you have a clear picture of your current situation, it's difficult to know how to improve your storage environment(s). To help you begin, we have included a sample survey for you to fill out.

Tips for surveying your records.

Now that you understand how storage environment can degrade paper, microfilm, and computer disks and tapes, we recommend that you take a new look at your storage areas.

- Look for signs of damage from water, light, pests, etc. Consult the Storage Guideline tables in Sections 4, 5 and 6 for tips on how to recognize signs of damage.

- Look for potential threats such as dripping pipes, open windows, radiators, etc.

- Make sure you survey **all** of your storage areas. Don't forget about the closet you use only rarely. Don't skip over an area because it's "someone else's" responsibility.

- Fill out a separate survey for each room. Make photocopies before you begin.

Use the space below to list all the rooms and/or buildings in which you store court records:

STORAGE CONDITIONS SURVEY

Use this form to record information about your records storage area.
If you use more than one storage area, ***make photocopies*** of this survey:
YOU SHOULD FILL OUT A SEPARATE SHEET FOR EACH AREA.

STORAGE AREA	
Record the length, width, and height of the room. *(approximate is OK)*	Length: _____ Width: _____ Height: _____
Briefly list the types of court records stored in this area.	
Formats? *(please check all that apply)*	❑ Paper ❑ Bound volumes ❑ Microfilm ❑ Computer disks ❑ Computer tapes
Is this also a "people area?"	❑ Yes ❑ No ❑ Don't Know
Is food allowed in this area?	❑ Yes ❑ No ❑ Don't Know
How often is it cleaned?	❑ Daily ❑ Weekly ❑ Monthly ❑ Other ❑ Don't Know

RECORDS & CONTAINERS	
How are records in this storage area housed? *(please check all that apply)*	❑ In folders ❑ In boxes ❑ On floor ❑ Closed shelves ❑ Open shelves
Are any of your storage containers "archival?" *(also called "acid-free" or "alkaline")*	❑ Yes ❑ No ❑ Don't Know

LIGHTING	
What kind of lighting is used in this area? *Check all that apply*	❑ Natural *such as windows or skylights* ❑ Artificial *indicate type below:* ❑ Fluorescent ❑ Incandescent ❑ Don't Know
Do you control the levels of light in storage areas? *If yes, please explain how.*	❑ Yes ❑ No ❑ Don't Know

CLIMATE CONTROL			
Is there heat? Yes ❑ No ❑ Don't Know ❑	**Air Conditioning?** Yes ❑ No ❑ Don't Know ❑	**Humidity controls?** Yes ❑ No ❑ Don't Know ❑	**Windows/doors to the outdoors?** Yes ❑ No ❑ Don't Know ❑
Do you set the heat or A/C "back" either at night or during the weekend? Yes ❑ No ❑ Don't Know ❑		**If you have windows or doors to the outdoors, are they ever propped open?** Yes ❑ No ❑ Don't Know ❑	

SECURITY			
Does the public have access to this storage area?	❑ Yes	❑ No	❑ Don't Know
Do you have a system of locks and/or alarms? *If yes, please describe briefly*	❑ Yes	❑ No	❑ Don't Know
Do you have fire extinguishers? *If yes, please describe briefly*	❑ Yes	❑ No	❑ Don't Know

HAVE YOU HAD PROBLEMS WITH DAMAGE FROM ANY OF THE FOLLOWING?

If yes, please explain briefly in the space provided

Water ❑ Yes ❑ No	
Light ❑ Yes ❑ No	
Insects ❑ Yes ❑ No	
Rodents ❑ Yes ❑ No	
Mold or fungus ❑ Yes ❑ No	

Appendix A: HELPFUL RESOURCES

Conservators and Conservation Centers:

State Historical Society of Wisconsin Conservation Program
Sharlane Grant: 608/264-6474

Sharlane is the Preservation Officer at the State Historical Society, and is in charge of the society's conservation lab. Feel free to call her if you need advice or recommendations regarding preservation.

Northeast Document Conservation Center (NEDCC) -

The NEDCC is a nonprofit conservation center whose goal is to improve the preservation programs of libraries, archives, museums, and other historical and cultural organizations. It provides the highest quality services to institutions that cannot afford in-house conservation facilities or that require specialized expertise. http://www.nedcc.org/

Archival Supplies:

Company Name	Phone / Fax	Email / WWW	Notes
Conservation Resources	1-800-634-6932		120 pp. **catalog**
Gaylord Archival	1-800-448-6160 ***Free Preservation Help Line: 1-800-428-3631**	http://www.gaylord.com	168 pp. **catalog**. Free pamphlets. Free Help Line.
The Hollinger Corp.	1-800-634-0491	hollingercorp@interserf.net	**Catalog**. Manufactures boxes for the Nat'l Archives
Image Permanence Institute *(Research Lab)*	716-475-5199 Fax: 716-475-7230		A-D Strips: Film Base Deterioration Monitors (for vinegar syndrome).
Light Impressions	1-800-828-6216 Fax: 800-828-5539		99 pp. **catalog** Specializing in photographic materials
Metal Edge West, Inc.	1-800-862-2228 Fax: 213-588-2150		16 pp. **catalog** Makes custom boxes.
Preservation Products Unlimited	1-800-648-7329 Fax: 402-465-4230	PPUNL@aol.com	30 pp. **catalog**
University Products	1-800-628-1912 Fax: 800-532-9281	http://www.universityproducts.com	208 pp. **catalog**

World Wide Web Resources:

Conservation OnLine (CoOL) - http://palimpsest.stanford.edu/

An *excellent* starting point for finding additional information about conservation issues. CoOL is a large full-text library of conservation information, covering the following topics:

Copyright and Intellectual Property
Digital Imaging
Disaster Planning and Response
Documentation
Education and Training
Electronic Media
Electronic Records
Environment
Ethics
Health & Safety
Library Binding
Mass Deacidification
Mold
Preservation-related Organizations
Pest Management
Reprographics
Suppliers
Bibliographies & Resource Guides
Dictionaries, Glossaries, Abbreviation Lists

Conservation OnLine also provides links to other conservation organizations, which helps to make it such a great starting point.

Northeast Document Conservation Center (NEDCC) - http://www.nedcc.org/

Creators of quality low cost publications and Technical Leaflets. There is plenty of free information on this Internet site, including some NEDCC Leaflets.

Library of Congress Preservation Homepage - http://lcweb.loc.gov/preserv/

Includes Frequently Asked Questions, plus a separate section on Emergency Preparedness.

Disaster Recovery Journal - http://www.drj.com/

Includes a vendor directory categorized by type of service.

Appendix B: SUGGESTED READINGS

General Preservation Issues and Storage Environment:

Lull, William P. ***Conservation Environment Guidelines for Libraries and Archives***. Ottawa: Canadian Council of Archives, 1995. Canadian Council of Archives, 344 Wellington St., Rm. 1009, Ottawa ON, K1A ON3. (613) 995-0210

Ritzenthaler, Mary Lynn. ***Preserving Archives and Manuscripts***. SAA Basic Manual Series. Chicago: Society of American Archivists, 1993. SAA, 600 South Federal St., Suite 504, Chicago, IL, 60605. (312) 922-0140.

Emergency Management / Disaster Planning:

Forsten, Judith. ***Disaster Planning and Recovery: A How-To-Do-It Manual for Librarians and Archivists***. How-To-Do-It Manuals for Libraries, No. 21. New York: Neal-Schuman, 1992. SAA Publications, 600 S. Federal, Suite 504, Chicago, IL 60605. (312) 922-0140.

Walsh, Betty. ***Salvage At A Glance***. Distributed by the Western Association for Art Conservation (WAAC). Single sheet made of durable synthetic paper. Outlines whether to freeze or dry, notes special handling precautions, and describes how to pack and dry materials. Available for $10 when you order Vol. 19, no 2 of WAAC's newsletter. ($8 when ordering 10 or more). 1272 N. Flores Street, Los Angeles, CA 90069-2904. Phone:(213) 654-8748

There are several Internet sites on emergency management and disaster planning.
See listing in Appendix A.

Preservation Microfilming:

Fox, Lisa L., ed. ***Preservation Microfilming: A Guide for Librarians and Archivists.*** 2d ed. Chicago: American Library Association, 1996. ALA, Book Order Fulfillment, 50 E. Huron St., Chicago, IL, 60611. (800) 545-2433, ext. 7. ALA order code 0653-2-2036.

Electronic Records:

Rothenberg, Jeff. ***Ensuring the Longevity of Digital Documents.*** Scientific American, Jan. 1995, Vol. 272 Issue 1, p. 42.
Often described as the best article on electronic records for anyone who isn't a computer whiz.

Van Bogart, Dr. John W. C. ***Magnetic Tape Storage and Handling: A Guide for Libraries and Archives.*** Washington, DC: Commission on Preservation and Access (CPA); St. Paul, MN: National Media Laboratory, June 1995. CPA, 1400 16th St., NW, Suite 740, Washington, DC, 20036-2217

Appendix C: THE DIGITIZATION BANDWAGON

Digitization is Great for Access

At first glance, digitization and imaging look like a superior form of records storage.

- Each copy is an exact clone of the original.
- Availability of perfect copies keeps original from being overused.
- Multiple users can access the same information simultaneously.
- Records don't need as much storage space.
- Retrieval is fast.
- Advanced search techniques (such as keyword searches) can be used to find information.

Digitization is Not a Long-Term Storage Solution

Digitization is a great way to increase access to recorded information, but long term storage of digital information requires diligence and active management. Storing digital information can also be very expensive.

- Hardware and software become obsolete about every five years.
- Digital information has to be stored on a physical medium such as disks or tapes. Even by the most generous estimates, these materials have a lifespan of less than 50 years.

The Case of the 1960 Census

The National Archives had a difficult time obtaining portions of the 1960 Census, which they had identified as having long-term historical value. The records were stored on tapes that the Census Bureau could read only with a tape drive that was long obsolete.

> **"When the computer tapes containing the raw data from the 1960 federal census came to the attention of NARS [the National Archives and Records Service], there were only two machines in the world capable of reading those tapes: one in Japan and the other already deposited in the Smithsonian as a relic."**
>
> *(Committee on the Records of Government 1985:9, 86-87)*

A (Mostly) Happy Ending...

By 1979, nearly all the requested data had been successfully copied onto industry-standard tapes. (Of the original 1.5 million, 10,000 records were not successfully recovered).

Cost of Digitization

When calculating costs of digitization, do not overlook the following:

- Upgrading the hardware, software and operating system(s).
- Conversion costs for transferring data to the new program / system.
- Technical support.
- Continuous training.

Legal Requirements for Digitization of Court Records in Wisconsin:

The following list includes most of the requirements outlined in SCR 72.05.
For a complete listing, please refer to:

SCR 72.05
"Retention of Court Records Maintained as Official or Original Information on Electronic or Optical Storage Systems."

Record Keepers Must:

- Protect the authenticity, confidentiality, and readability of recorded information.
- Provide appropriate security measures.
- Sample the records to make sure they are legible and readable (re-scan if necessary).
- Maintain the hardware and software necessary to retrieve, read, and reproduce any record in a timely manner.
- Have a procedure to backup and recover electronically or optically stored records.
- Maintain a backup copy of all records and data using accepted computer backup procedures.
- Accurately document the electronic or optical systems that produced the records.
- Check data at least once every three years and update, migrate, or convert as necessary.
- Transfer records on optical disk to a new disk or new media before 50% of the manufacturer's certified useful life is exceeded.
- **Submit a written plan** to the director of state courts for prior approval to ensure compliance. Each plan must include:
    - A comparison of conversion costs vs. ongoing current costs.
    - A data migration plan.

Conclusion

Is it *impossible* to keep court records in digital form? No, but it *is* both difficult and costly. Wholesale digitization of official records without careful planning could spell disaster. We hope that anyone considering such a move will make every effort to learn as much as they can about the possible consequences.

For a list of further information, please consult Appendix B: "Suggested Readings."