



Rutgers
University
Libraries

REINVESTMENT IN KNOWLEDGE:

**PRESERVATION OF LIBRARY MATERIALS IN
THE RUTGERS UNIVERSITY LIBRARIES**

**REPORT OF THE PRESERVATION PLANNING TASK FORCE
MAY 2001**

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I. Executive Summary

This report addresses issues related to the preservation of library materials for the Rutgers University Libraries (RUL) at the beginning of the twenty-first century. Rutgers has already made major investments in its collections. From a recent insurance appraisal and other sources, the value or replacement cost of our current collections is estimated to be significantly more than \$.5 billion. Our collections have been developed for over a century by knowledgeable selectors in collaboration with members of the academic departments which they serve. The total value of the collections including the value of the items themselves and the intellectual effort in selecting and making them available to the public is incalculable.

Since all library materials are subject to deterioration and ultimately destruction through use, natural decay of organic material, and technological obsolescence, RUL must reinvest in these intellectual resources through a systematic preservation program.

There are two basic approaches to preservation: the collection-level approach and the item-level approach:

Collection-Level:

- Monitoring and maintaining environmental conditions with appropriate HVAC systems that slow the deterioration of organic materials.
- Preventing collections from threats such as pests and mold through proper stacks maintenance activities.
- Diminishing the likelihood of disasters that threaten collections and responding quickly and effectively to those disasters that do occur.
- Educating staff and users on how to best handle and care for all formats of library materials.
- Providing appropriate security measures and environments that maintain the integrity of all collections.

Item-level:

- Migrating, refreshing, encapsulating or emulating electronic and digital information.
- Reformatting audio and video collections that deteriorate due to the impermanence of the media used to record them or become unusable through the obsolescence of the technology used to record them.
- Reformatting brittle and fragile materials.
- Offering basic book repair for heavily used circulating collections and providing housing options for pamphlets, music scores and other vulnerable printed formats.
- Organizing and providing quality control for materials that are sent to library binders for rebinding.
- Providing more sophisticated conservation treatments for rare, unique and archival collections either in-house through the Special Collections and University Archives Preservation Lab, or contracted to regional conservation labs or private conservators.

Each format, which we have categorized as Paper-Based, Audio/Visual, and Digital Collections, has unique preservation challenges.

While RUL is engaged in basic binding of periodical and damaged books and has a preservation program for materials in Special Collections and University Archives, it does not have a systematic or credible preservation program for the vast majority of its collections. This situation is clearly demonstrated from a comparison with peer institutions as well as from our survey of current RUL preservation activities.

In order to develop a RUL preservation program that will address the need of our endangered library collections, the following is a summary of recommendations by the task force of Preservation Planning:

- Establish a position of Preservation Administrator to oversee RUL preservation activities especially related to the general circulating collections where the greatest investments have been made and where the most problems are. There will be an interim appointment for 2 to 3 years of a current RUL faculty member who will develop staffing and budget plans, begin systematic training of personnel in preservation issues and techniques, and begin a variety of projects. After that time, RUL will seek a permanent Preservation Administrator.
- In selected areas of unique research strength, such as in Special Collections and University Archives, the Institute for Jazz Studies, and original RUL digital creations, significant preservation and conservation efforts on a broad front are necessary.
- Preservation treatment of individual items in the stacks will be approached on a programmatic basis related to collection strengths and needs.
- Identification of items in the stacks in need of preservation treatment will be carried out by a review of returned circulating materials that are damaged or brittle, and by selectors and teaching faculty reviewing items on the open shelves.
- Increase cooperative preservation projects with regional and national efforts. We cannot do it all on our own.
- Weed materials no longer needed and consolidate scattered holdings of back runs of periodicals and multi-volume sets into one location. By reducing the number of items and locations where material resides we will focus our preservation efforts, as well as make our collections more coherent.
- There must be a comprehensive plan to create cataloguing records for all items held in RUL collections, including metadata for digital products. Without adequate records to access the items we own, we are not preserving them for future use.

Paper-Based Collections recommendations are related to the following areas:

- Environmental and Facilities Monitoring, Surveys, and Upgrades including utilizing collection space more effectively
- Binding, Repair, and Reformatting of Paper-Based Collections, including a revamping of binding operations and developing mini-workstations for book repair in branch libraries.
- Appropriate Handling and Housing of Collections
- Security, including appropriate training and policy development and the replacement of security gates

Audio-Visual Collections recommendations include:

- Training in basic rules of storage, handling, and playback
- Developing a sound preservation studio in the Institute for Jazz Studies

Digital Collection recommendations include:

- Form an RUL Digital Archiving Group to address systematically preservation issues for unique RUL digital collections
- Create a Digital Preservation Laboratory

II. Valuing our Collections

The Libraries provide access to scholarly resources that support intellectual inquiry, knowledge creation, and lifelong learning for the students and faculty of the university, the citizens of the State of New Jersey, and the broader scholarly community.

—Excerpt from RUL Mission Statement

The new library is characterized most specifically by its ability to use technology to enhance information services to students and faculty, to support new instructional methodologies, and to improve access to all forms of information.

—Excerpt from RUL Digital Library Initiative

RUL Collections and Users

The 1999/2000 Annual Report stated that RUL contained 3,295,373 physical volumes, and an additional 2,560,289 government documents; 4,349,896 microform items; 125,748 audio and visual materials; and 217,583 information or vertical files, as well as more than 90,000 digital books, nearly 5,000 cataloged e-journals, over 80 indexes and databases, and a growing number of digital collections unique to Rutgers. This collection of resources supports nearly 50,000 students, over 2,500 full-time faculty, over 100 undergraduate majors and masters fields, and 65 Ph.D. fields. The collections needs of this diverse community and range of programs are complex and vast.

The Investment of the University

In the last ten years, RUL has spent over \$60 million to acquire scholarly and informational resources. An insurance appraisal conducted in the spring of 1999 indicated that the replacement cost for books, journals, and microforms housed in the major libraries (Alexander, LSM, Kilmer, Douglass, Dana, and Robeson,) *excluding* rare material, manuscript collections, and all other formats, was more than \$.5 billion.¹ Thus, the total replacement value obviously is much more than that figure. The additional costs incurred in making these resources available are significant as well and recently include:

- Most of the over \$14 million in annual RUL salaries and wages pay people who are involved in activities related to acquiring and making available these resources: selectors who evaluate and select resources; the technical services staff, who order, receive, and catalog all resources and systems staff who network electronic resources; reference librarians who assist patrons using the materials; unit technical services staff who bind, circulate books, and maintain stacks.
- A purchase of over \$1 million for a new integrated library system, SIRSI, which gives access to information about the collections.
- Over \$1 million in annual expenditures in equipment and supplies to make the collections accessible.

¹ Factory Mutual Insurance Company estimated the replacement value at \$536,774,000. A recent evaluation of the University of Missouri-Columbia campus library system, which has a smaller collection than RUL, estimated its value, including rare books, at over \$1.6 billion. (From LAMA Fiscal Officers Listserve.)

The Concept and Responsibilities of Stewardship

After initial investments in acquiring and making available collections to users, an institution has a further responsibility for maintaining those collections. This area of responsibility is becoming known as stewardship and two of the key functions covered by it are preservation and preservation.² Preservation and security insure that materials will be accessible for all user groups.

As stewards, we have a responsibility to care for the many formats in our collections that fulfill so many different needs of our users. We must maintain the value of our initial expenditures in the resources we already own by insuring that the material can continue to be used. The vast majority of our collections, as well as those of other ARL libraries, are paper-based books and journals. Based on surveys done by other research libraries most of the paper used in books and journals is acidic, a condition that leads to decay and embrittlement of paper over time. In fact, 25-35% of these materials have become so brittle that materials cannot be used without damage to the paper.³ In addition to the problems of brittle paper, bound materials suffer from deteriorating bindings and need repair or rebinding in order to remain useable.

But Rutgers and other large universities have never limited their collecting to solely paper-based materials. Sound and audio-visual collections can be found in most libraries. Much of this material in Media Services and the Music Library at the New Brunswick campus, Newark's Dana Library, and Camden's Robeson Library is not unique or rare, but Rutgers has two repositories with sound and audio-visual collections, the Institute for Jazz Studies in Newark and Special Collections and University Archives.

During the last decade of the twentieth century, the digital revolution began in force and launched a new age in scholarly communications. The digital revolution has introduced new challenges to libraries, both in terms of developing a new infrastructure for digital formats as well as archiving or preserving this new and untested format. The twenty-first century presents librarianship and academic institutions in general with a profound concern: how do we intelligently and efficiently preserve for future generations the knowledge we have collected in the past and collect today? These resources are after all the foundation on which new knowledge is created in the future. This report seeks to address these issues for the Rutgers University Libraries (RUL) at the beginning of the twenty-first century.

III. The Formation and Charge of the Preservation Task Force

In October 1999 the Preservation Task Force was established to examine the challenges facing RUL and other academic libraries in preserving collections in all formats. The membership of the task force brings a wide variety of perspectives on preservation issues. The membership includes a

² Reference to the "To Protect and Preserve Conference" at L.C. in October 2000.

³ *Preservation: Issues and Planning*, ed. Paul N. Banks and Roberta Pilette (Chicago, 2000): 91-92.

conservator for special collections, a person in charge of access services bringing the perspective of preservation needs of circulating collections, the head of a large special collection department, a librarian in a special collection of jazz materials with expertise in sound recording preservation, a humanist selector with knowledge of digital and paper conservation issues, a digital project specialist who is a leader in the international digital archiving community, a collection development and management administrator who oversees the rapid growth of digital collections and maintains a love for books, and a manager of the digital and media services with expert knowledge of moving image collections.

The complete charge of the committee is included in Appendix I; the following is an excerpt from the charge:

We are standing at a critical junction in the evolution of research libraries. We are the custodians of massive amounts of physical objects, primarily in paper format, and negotiating an explosion of information in electronic formats. One of the primary functions of a research library is to preserve human knowledge and the information that is needed to create that knowledge. The Rutgers Libraries must determine their role in preservation: 1.) what should they preserve? and 2.) how should they preserve it?

In this report the preservation needs of all types of collections from our traditional paper-based materials to our audio-visual collections to our digital resources will be addressed. We will focus on what our current practices are in the areas of preservation and security, what our peers are doing, and how we can improve our efforts in caring for our collections. We will identify weaknesses in our current security practices and methods to redress these problems. We will also make short-term and long-term recommendations about the development of a preservation program for RUL.

IV. Preservation Challenges

Preservation functions can be divided into two distinct areas of endeavor: those activities that create and maintain an optimal environment that surrounds whole collections and those which are based on specific item and collection care by format.

Collection-Level Concerns

Even though all organic materials deteriorate, no library can afford individual remedial care for every item in its collections. This compels the library to act in ways that benefit the *entire* collection and prevent or delay deterioration. Common programmatic activities in this area include: Monitoring and maintaining environmental conditions with appropriate HVAC systems that slow the deterioration of organic materials.

- Preventing collections from threats such as pests and mold through proper stacks maintenance activities.
- Diminishing the likelihood of disasters that threaten collections and responding quickly and effectively to those disasters that do occur.
- Educating staff and users on how to best handle and care for all formats of library material.

- Providing appropriate security measures and environments that maintain the integrity of all collections.

Item-Level Needs by Format

Through high use and the impermanence of certain media, many items require a greater level of care than overall maintenance can provide. To save intellectual content or the artifactual value of selected items specific action is required. Activities to preserve such items include:

Paper-Based Materials:

- Reformatting brittle and fragile materials.
- Offering basic book repair for heavily used circulating collections and providing housing options for pamphlets, music scores and other vulnerable printed formats.
- Organizing and providing quality control for materials that are sent to library binders for rebinding.
- Providing more sophisticated conservation treatments for rare, unique and archival collections either in-house through the Special Collections and University Archives Preservation Lab, or through contracted regional conservation labs or private conservators.

Audio/Visual Collections:

- Reformatting sound and moving image collections that deteriorate due to the impermanence of the media used to record them or that become unusable through the obsolescence of the technology used to record them.

Digital Collections:

- Migrating, refreshing, encapsulating or emulating electronic and digital information.

In the next parts of this section on preservation challenges we will discuss preservation needs by format type.

Specific Preservation Challenges By Format

Paper-Based Collections

Acidic and Brittle Paper:

The problem of brittle books and acidic paper in research institutions has been well documented for many years. Acidic paper largely results from methods and materials used to manufacture paper beginning in the mid nineteenth century. The shift from linen and cotton fiber rags to wood pulp as a paper source and the use of harmful chemicals during and after manufacture such as alum rosin sizing all contribute to less permanent paper. In addition, high and/or fluctuating temperatures and relative humidity along with the presence of gaseous pollutants accelerate deterioration. Acids degrade and shorten the length of the cellulose fibers in the paper resulting in the gradual weakening and embrittlement of the paper. The deterioration can proceed to the point where the books cannot be handled without damage to the paper. Humanities and social science collections tend to have the

most brittle paper in research collections. This is due to the greater rate of retention of older volumes necessary for research.

Currently there are two viable preservation strategies for addressing the problem of acidic paper in circulating collections. The first is mass deacidification. Mass deacidification is appropriate for collections of acidic paper that are not yet brittle. The process involves depositing alkaline material into the textblocks of the volumes with acidic paper. Deacidification will forestall embrittlement of paper, but it will not increase the strength of severely brittle paper. Books do not need to be disbound to be deacidified, but the bindings must be in good enough condition so the handling involved in the process does not damage the books.

For books that do suffer from extremely brittle paper, reformatting is the most appropriate course of action. Reformatting involves duplicating the information from the original text onto a more stable medium. Reformatting methods commonly used include preservation photocopying, microfilming and digital scanning. Each method has strengths in specific situations. Photocopying is inexpensive and results in a new item often most similar to the original item. Microfilming saves space, permits multiple copies to be made from a master, and can be very stable. Digital scanning offers broad access and can have high resolution that permits capture of great detail. And by a similar turn each has disadvantages. A photocopying provides a single (or however many copies were originally made) copy which if copied again continues to lose detail. Microfilm is unpopular with users. Digital scanning results in a new digital artifact that requires substantial preservation intervention to insure ongoing access – as will be described below. Often a combination of reformatting options may be the best approach to save brittle collections.

Book Repair:

Along with problems of acidic paper, circulating collections also suffer from deteriorating and damaged bindings. In many cases these books can either be rebound completely by a library binder or if the damage is less serious, in-house repair may be appropriate. In-house repair can be accomplished more quickly and with less expense than sending books elsewhere to be rebound, particularly when repairs are minor.

Library Binding:

Periodicals and monographs are often sent to library binderies to be bound or rebound. Periodicals are sent to binders so that all of the issues from a specific year can be bound together. Monographs are usually rebound due to the poor condition of the binding. The preservation community has worked with library binders, particularly members of the Library Binding Institute, to develop standards for the materials and methods used to bind books. In recent years the preservation community has encouraged the use of more flexible leaf attachment to make photocopying easier and higher quality materials. Preservation departments in libraries often provide a central location for sending out library binding materials and quality control for returning materials. Preservation administrators often help develop RFP's and negotiate contracts with binders.

Special Formats:

There are particular types of printed material that are vulnerable to damage because of their size or format. Pamphlets can be easily lost on shelves because of their thinness; putting them in housings or pamphlet binders is recommended to provide them with additional strength and substance. Maps and broadsides require flat files to be properly stored and handled. Musical scores require special housings or bindings to keep numerous parts of a score together.

Special Collections Materials:

Materials that are located in special collections tend to have more value as artifacts than those commonly found in circulating or general collections. This artifactual value changes the preservation approach to holdings. Conservators who repair special collections materials tend to work more closely with curatorial staff on decision making for specific items than a collections conservator would for general collections. Repair work is usually less invasive so as to retain as much of the original binding or structure as possible. Boxing is often preferred over treatment for items that are not frequently used. Boxes and other types of housing provide stability and keep pieces of damaged books together while leaving the volume itself unchanged. Finally the repair and conservation treatment of special collections materials is thoroughly documented so that a record can be kept describing what changes have been made to specific items.

Audio-Visual Collections

As with paper-based collections, audio-visual collections benefit from basic preservation care such as appropriate storage and educated handling. Close environmental control, particularly in relation to temperature and relative humidity levels, also prolong the life of audio-visual collections.

There are key differences between the needs of paper-based and audio-visual collection materials. Unlike paper-based collections, audio-visual materials are machine readable and require equipment to access their information. If this machinery is not available due to obsolescence or disrepair, access to that information is lost unless the audio-visual material can be recopied onto a more current format. The many different formats of audio-visual material in existence and the instability of these formats compound preservation problems. The final and most intractable preservation problem with many audio-visual (and digital collections) is that once information is lost due to failure of the media type, it can be extremely difficult and often impossible to regain the lost information.

More specific information on sound recordings and moving image collections follow.

Sound Recordings:

Unlike collecting print materials, collecting sound recordings is a relatively recent phenomenon. The Library of Congress did not receive its first sound recording until the early 1900s, and did not acquire large sound recording holdings until the 1920s and 1930s. As late as World War II, very few institutions were actively collecting sound recordings. With the invention of the long-playing (LP) record in the early 1950s, the picture began to change. More and more libraries began collecting sound recordings. Widespread availability of the audiocassette in the 1960s and the compact disc in the 1980s further served to expand collecting. Considering the importance that sound recordings now

play in our society, from a cultural, economic, and historic standpoint, and the irreplaceable nature of many of those recordings, the preservation, and in some cases, restoration of sound recordings has become a growing concern. RUL has over 125,000 audio and visual materials. (For an Inventory of Sound including Moving Image Magnetic Tape Collections in RUL, see Appendix III.)

Generally speaking, all grooved phonodisc collections suffer from some degree of wear. All discs with grooves are damaged every time they are played. The heat generated by the friction of the playback stylus riding in the grooved walls of the disc temporarily deforms the grooves. That is why a disc should be allowed to rest 24 hours after one play to allow the grooves to cool down and return to their normal shape.

The sound on compact discs is captured and reproduced digitally and therefore requires a completely different technology than analog grooved phonodiscs. A laser reads the digital information on a CD causing no wear on the disc no matter how many times it is played. Life expectancy numbers for CDs are still in question, but most experts believe they should last at least 30 to 50 years. Some will undoubtedly last longer than others depending on the production values of the manufacturers of the discs.

Magnetic tape is made up of two layers: a base layer, and a thin binder layer that is bonded onto the base. The binder contains ferromagnetic particles whose permanent alignment within the binder produces the copy of sound waves. The chemical composition of the binder (which differs from manufacturer to manufacturer) and the uniformity and smoothness of application affect audio quality, noise level, tape-to-head contact, and friction. These factors also affect the tape's aging properties. (For a more detailed, technical discussion of preservation issues related to sound collections, see Appendix IV: Problems Unique to Sound Collections.)

Moving Image Collections:

Moving image collections are generally valued in institutional contexts for the information they contain. As moving image collections deteriorate, often the best preservation option is reformatting the images on more stable bases or supports.

Film-based moving image collections are found on three supports: cellulose nitrate, cellulose acetate, and polyester. Cellulose nitrate was the first flexible film support in broad use. Due to the molecular structure of the polymer cellulose nitrate, the film support can be extremely flammable. As nitrate film stock deteriorates it can ignite. As the film burns it generates oxygen that feeds fire thus becoming self-fueling. In response to these safety issues cellulose acetate was developed as a film base.

The majority of motion picture film in educational institutions tends to contain cellulose acetate film stock. Cellulose acetate, although not explosive, degrades and produces a characteristic acetic acid smell—leading to the name “vinegar syndrome.” Another feature of degrading acetate film stock is that, if neglected, it shrinks, warps, and eventually becomes too deteriorated to reformat. Cellulose acetate continues to be used as a film support for motion pictures.

Polyester is the most stable film support and is, therefore, the best medium for reformatting film-based collections. It is also the recommended support for microfilm collections.

Like some sound recordings, videotape is also a form of magnetic media. Problems of binder separation and equipment damage to the media apply to both videotape and audiotape. The large variety of sizes and proprietary brands of tape compound the preservation challenges of videotape. There are over fifty different formats of videotape in existence, and many examples of these reside in research collections.⁴ A variety of playback equipment might be necessary in order to view an array of materials. This can lead to difficulties as playback equipment and spare parts necessary for its repair become hard to find. As with brittle paper the most viable option becomes reformatting (although this is currently a very expensive process). There are three options for reformatting videotape, two of which are tape-to-tape transfers. The first kind of tape-to-tape transfer is to copy analog videotape to another generation of analog videotape. The second kind of tape-to-tape transfer is to reformat analog videotape to digital information stored on tape such as Digibetacam. The third option is to reformat analog videotape to digital information that is stored on a server.

Digital Collections

While solutions to preservation issues for paper-based media and sound recordings are relatively well understood, the preservation of digital resources, like the medium itself, is in its infancy. Simply stated, academic and research libraries are generally ill prepared to preserve their digital archives and information resources. Further, it is quite evident that designers of supporting information technology have not created solutions that will allow us to preserve digital materials easily at a predictable and reasonable cost. Lysakowski and Leibowitz (2000) predict a \$20 trillion loss of information over the next 20 years.⁵ Graham (2000) suggests that a major academic scandal will need to occur before sufficient attention and resources are focused on the problem of preserving our digital content.⁶ Although we do not have ready solutions at hand, we must start now by learning and doing and building a competency in digital preservation.

Definition and Issues:

There are many definitions of digital preservation in the literature. Our working definition is, “The preservation of material that is available in electronic form and where the digital version is considered to be the primary archival item.” Using this definition, we need to address many types of digital resources including digital books, journals, databases on the Web, and even audio and video

⁴ Information on video formats can be found in the web pages of the Electronic Materials Specialty Group of the American Institute for Conservation: <http://216.149.118.71/VideoID/>

⁵ Lysakowski, R. & Leibowitz, Z. (2000). “Looming Information Age Crisis Expected to Cause Trillion-Dollar Losses over the Next 20 Years: Titanic 2020 – A Call to Action.” Available at: <http://www.censa.org>.

⁶ Graham, P. “RLG and Archiving at the Heart of the Research Library Mission.” *RLG News*. Winter 2000. (50) 12–13.

tapes that are currently recorded in analog formats but which will be digitally reformatted. Our discussion of preservation concerns for these resources encompasses the following:

- Documentation on production and use
- Cost and rapid obsolescence of technology
- Impermanence of the medium
- Mutability of the content (*easily changed – legal issues*)
- Need to guarantee integrity of digital information
- Determination of what to preserve (underlying information, “look & feel,” etc.)

Approaches:

There are three basic approaches to digital preservation that have been discussed in the literature. These are:

- Migration: the transferring of digital materials from one media or format to another because of obsolescence, failure in media, software updates, standards, etc.
- Emulation: the mimicking, in software, of a piece of hardware or software so that other processes think the original equipment/function is still available in its original form.
- Encapsulation: the grouping together a digital object and anything else necessary to provide access to that object. This technique aims to overcome the problems of the technological obsolescence of file formats because the details of how to interpret the digital bits in the object can be part of the encapsulated information.

These solutions will not be discussed in detail in this document. Suffice it to say that the only practical solution to digital archiving at this time is to migrate the materials forward based on some change in the digital environment. For example, a vendor might upgrade an operating system or a version of application software. Recently in the Scholarly Communications Center, we have been migrating MS-Access databases from Access97 to Access2000. Other events that would require migration include media refreshing (e.g. re-writing a CD) or media conversion (e.g. converting from diskette to CD). Unfortunately, the migration process is error prone and labor intensive, but it is the only process that can be made to work practically at this juncture in our digital library evolution. Frequently, a vendor will provide the capability within a new release to convert from the old version to the new version.

One of the most difficult aspects of migration concerns media failure. In particular, CDROMs, DVDs, and diskettes are subject to failure without advance notice. The only approach for a preservation manager is to anticipate the failure by migrating (or refreshing) the material *before* media failure. Contrary to some predictions, we have an ever growing collection of CDs and we are beginning to add DVDs to our library collection. For many commercial vendors and the government, it is easy to write a CD, send it to the customer, and let the customer worry about whether it should be preserved or not. Some experts in the field are suggesting that a CD may conservatively have a life span of only 5 years.

In concert with the above migration process, standardization must be considered, where possible, of formats that are universal and will persist across changes in the digital environment.

Documents: Adobe's Portable Document Format (PDF) is actually quite close to a universal format. PDF is a "container format" that permits capture, publishing, sharing, and preservation of complex compound documents. More than 140 government agencies worldwide have adopted PDF as their standard for document submission and archiving (Lysakowski & Leibowitz, 2000). Even given this strong evidence of having a *de facto* standard in PDF, we may still want to capture documents in a more basic archival format such as "tif" and then use PDF as a presentation format.

Databases: There is no comparable universal format for databases. Generally, database publishers use some popular proprietary product such as those provided by Microsoft or Oracle. These products provide many options for exporting data into other more basic formats such as comma delimited text. Unfortunately, these export processes generally lose some of the important characteristics of the database definition including field formats and hierarchy.

V. Preservation at Peer Institutions

Many research libraries have coordinated preservation programs. They have developed methods and spaces to address many of the concerns with library materials that were described in the previous section. In this section of the report we will examine overall preservation activities and funding in the top quartile of public AAU institutions, as well as offer a more in-depth look at three peer institutions with programs of various sizes and levels of activity.

Top Quartile of Public AAU Institutions

We began our investigations into preservation programs with an examination of public AAU institutions. The top quartile of public AAU institutions were chosen as our desired peer group by the University's strategic plan and also by RUL's five-year plan, *A Bridge to the Future: Digital Library Initiative*. The seven universities are the University of California, Berkeley; the University of California, Los Angeles; the University of Illinois at Champaign-Urbana; the University of Michigan; the University of Texas at Austin; the University of Washington; and the University of Wisconsin, Madison.

Table 1A compares general library measures and Table 1B compares the preservation staffing and funding levels at the seven institutions plus Rutgers. The comparisons are derived from ARL statistics. It should be noted that while we do have recent ARL statistics for general library activities (1998-99),⁷ preservation statistics have not been published since 1996-97.⁸

⁷ While ARL statistics are being criticized for not adequately reflecting new digital resources, they are appropriate for our purposes here since the greatest preservation challenge is in the area of physical objects, that is, paper-based materials, which ARL statistics represent well.

⁸ For ARL Preservation Statistics see: <ftp://www.arl.org/stat/presvstat/>

Table 1A. General Library Measures — Based on ARL statistics from 1998-99

Institution	Volumes Held	Volumes Added, Gross	Professional Staff	Support Staff	Expenditures for Binding	Total Library Expenditures
California, Berkeley	8,946,754	166,459	191	237	\$796,981	\$37,959,895
California, Los Angeles	7,401,780	157,189	140	274	\$609,107	\$37,984,020
Illinois, Urbana	9,302,203	135,098	162	238	\$218,204	\$26,700,017
Michigan	7,195,097	151,140	150	311	\$418,316	\$39,310,808
Texas	7,783,847	146,616	142	350	\$177,030	\$28,695,585
Washington	5,937,690	143,200	136	226	\$275,795	\$30,143,019
Wisconsin	5,962,889	90,704	170	195	\$206,947	\$29,681,576
Rutgers	3,777,538	89,752	107	241	\$260,971	\$26,034,808

Table 1B: Preservation Measures — Based on ARL Preservation Statistics from 1996-97

Institution	Preservation Admin.	Staff reports to P.A.	Library-wide preservation staff	Total pres. expenditures	% pres. as total of lib. expenditures
California, Berkeley	100%	15.29	33.23	\$2,084,958	6%
California, Los Angeles	100%	2.5	14.25	\$934,579	3%
Illinois, Urbana ⁹	25%	3.85	18.54	\$894,183	4%
Michigan	100%	25.75	76.4	\$1,579,166	5%
Texas	100%	25.88	43.5	\$1,165,189	5%
Washington	25%	3.4	13.77	\$738,682	3%
Wisconsin	25%	21.08	26.7	\$904,608	3%
Rutgers	0%	0	8.88	\$412,478	2%

While there are broad variations in staffing and expenditures on preservation, all of the institutions have staff responsible for overall preservation activity library-wide and also staff that report directly to the preservation administrator. In addition to this staff, there are also other positions within the libraries that are responsible for preservation activities that do not directly report to the preservation administrator.

Three Peer Institutions

While the seven AAU institutions are indicative of our aspirations, the Task Force also chose to examine the preservation programs and activities of three institutions that are similar to our present conditions. All three have preservation administrators and preservation programs in place (Michigan

⁹ The University of Illinois Library at Urbana-Champaign has recently advertised for a full time head of preservation (*Academic Libraries*, May 2000, p. 110).

was also one of the seven public AAU institutions). These universities are all state universities: Penn State, the University of Iowa, and the University of Michigan.

Table 2A. General Library Measures — Based on ARL statistics from 1998-99

Institution	Volumes Held	Volumes Added, Gross	Professional Staff	Support Staff	Expenditures for Binding	Total Library Expenditures
Iowa	4,027,546	124,456	91	128	\$208,316	\$20,529,026
Penn State	4,391,055	153,454	133	351	\$529,127	\$34,167,912
Michigan	7,195,097	151,140	150	311	\$418,316	\$39,310,808
Rutgers	3,777,538	89,752	107	241	\$260,971	\$26,034,808

Table 2B: Preservation Measures — Based on ARL Preservation Statistics from 1996-97

Institution	Preservation Admin.	Staff reports to P.A.	Library wide preservation staff	Total pres. expenditures	% pres. as total of lib. Expenditures
Iowa	100%	15.02	17.15	\$697,937	4%
Penn State	100%	12.00	15.70	\$839,940	3%
Michigan	100%	25.75	76.4	\$1,579,166	5%
Rutgers	0%	0	8.88	\$412,478	2%

All three peer institutions have established coordinated preservation activity, reflecting a wide array of experience from the large and well-established program at the University of Michigan to the rapidly growing new program at Penn State. Because preservation programs are not homogenous, the task force was interested in what functions were being undertaken, how they were staffed, and how they were funded. Task Force member Kristen St. John conducted phone interviews with all of the preservation administrators to learn more about their programming.

Preservation activities in these institutions are not identical, but share many common features. They all have book repair programs for circulating collections. Iowa and Michigan have specific staff dedicated to special collections conservation, and Penn State is planning to hire a conservator in the near future. Penn State and Michigan both are currently engaged in mass deacidification projects. Library binding is a centralized activity for all three universities and is managed by the preservation units. All of them participate in reformatting projects with much of the funding coming from grants.

There are also similarities and differences in staffing and funding. Iowa is able to draw on students and interns from their library school, the Iowa Center for the Book, and a unique book conservation apprentice program sponsored by the libraries. Michigan has a large number of staff dedicated to reformatting with a high percentage of those positions funded by grant projects, while Penn State has a growing staff that will include a conservator position in the near future. All three schools derive funding from a variety of sources that include library funds, grants and endowments—both Michigan and Penn State have endowed mass deacidification programs, and the head of preservation at Penn State has an endowed position. (For detailed reports on each program, see Appendix II.)

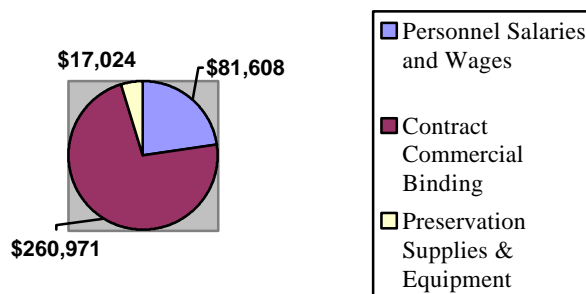
VI. Current RUL Preservation Activities and Expenditures

While RUL has no coordinated preservation program, we do carry out traditional preservation functions for paper-based material. All branches participate in the library binding of printed journals

and monographs. The collections access/services staffs of various campuses provide stacks maintenance and disaster recovery services. Minimal book repair is performed in most libraries. Two buildings, the Annex and the Special Collections and University Archives areas of the Alexander Library, monitor the temperature and relative humidity of their collection areas. Two pilot projects relating to brittle books have begun in the past two years. The most comprehensive preservation activities occur in Special Collections and University Archives, which employs a full-time conservator and has a working preservation laboratory.

RUL's current expenditures on preservation can be tracked through statistics gathered for reporting to the Association for Research Libraries (ARL). According to information gathered for ARL Preservation Statistics along with published ARL Statistics for the years 1998-99, RUL currently spends 1.3% of its total expenditures on preservation.¹⁰ The funds spent on preservation can be divided into three areas: personnel salaries and wages, contract commercial binding, and preservation supplies and equipment. The largest area of expenditure is for contract commercial binding at 72.6%. In the following section of this report we will describe current preservation activities.

1998-1999 RUL Preservation Expenditures



Commercial Binding

Commercial binding at RUL is decentralized. Different units employ a variety of binders, occasionally using more than one binder per unit.¹¹ Written contracts have not been negotiated with the binders and units rely on oral agreements. According to a "Survey of Current Binding Practices for Rutgers Library Units," this decentralization and the resulting autonomy accorded to units is popular. There was consensus among surveyed units that customer service and flexibility were higher priorities than the cost of binding.

The costs of this decentralization are clear upon comparison with peer institutions. According to ARL Preservation statistics, the median number of volumes bound by libraries with similar holdings

¹⁰Total expenditures taken from published ARL Statistics for 1998-9. Expenditures for preservation taken from data compiled by Nancy Hendrickson for 1998-9, as yet unpublished.

¹¹ From final draft of Current Binding Practices for Rutgers Library Units. March 1993. p. 1. Currently, the following binderies are being used: Ocker and Trapp, ICI, and Wert.

is 28,271 with median expenditures being \$193,900; for RUL the number of volumes bound are 27,288 on which we spend \$260,971. In terms of per volume costs, where peer institutions are spending \$6.86/volume, we are spending \$9.56/volume.

It seems clear that as more journals become electronic and academic libraries can rely on this format exclusively, there will be a declining need to bind journals. The money saved in this area could be developed to other preservation activities.

Book Repair and Collection Emergency Response

In addition to commercial binding activities, all campuses carry out some book repair and staff has been trained in collection emergency response. For instance, in 1999 a presentation, "The Water Emergency Demonstration" was presented on all three campuses and a slide show demo is available on the T-drive in the Alexander Library Server.¹² Systematic training in best shelving techniques is not yet in place. At some locations, such as the Alexander Library, when books are shelved or returned to the circulation desk, staff identify books in need of repair. In 2000 from July-December, 1,357 items from the circulating collections in New Brunswick were given varying levels of conservation treatment.

Brittle Books

Currently, circulation staff identify obviously brittle books as they are returned. These books are not returned to the stacks. They are put in a protective box, sent to a bindery for repairs, or sent to a selector to determine if a replacement copy is needed or available.

There are also two pilot projects related to brittle books taking place in Alexander Library. We have joined the Brittle Project that is an international cooperative effort in preservation photocopying founded and administered at the University of Kansas. The Brittle Project is an electronic listserve to which participating libraries post titles they wish to preserve. If other libraries want to acquire the posted title the price of that title is thereby reduced. Full bibliographic information is given for each title along with an estimated price depending on how many libraries request the title. The actual photocopying is done at the National Bridgeport Bindery to the standards set by the Preservation Librarian at the University of Kansas.

Brittle books may be reformatted in Rutgers Electronic Access to Library Information through Technology Integration (REALITI Project, URL: <http://www.scc.rutgers.edu/realiti/>), a digital preservation project for brittle books in the Alexander Library. Brittle books are scanned as tagged image format (tif) files and then converted using OCR software to a text format. The tif files also serve as archival copies. The text format may be marked up in XML, converted to portable document format (pdf) or even just served as plain text. The user will have the option of reading the text online, downloading the appropriate files to their computer or ebook and printing it. It is also hoped that we will be able to provide printing-on-demand through a certified library binder so that

¹² - Vol 1/Groups/Common/NB Col Mgmt group/Demos/Water Emergency Demo/pull-down menu entitled Slide Show/View Show.

we can have the book printed on non-acidic paper and bound at a nominal cost, lend it to the user and then add it to the collection. (See also section on Digital Preservation.)

Special Collections and University Archives Preservation Laboratory

In 1989 SC/UA turned a faculty line into a full-time administrative preservation position. Since this time SC/UA has developed an active preservation program for its collections. Preservation activities include monitoring environmental conditions, disaster planning and response, staff education, and pest management. In addition to these overall programs, SC/UA addresses the needs of its collections with large scale boxing projects, reformatting brittle and fragile materials through photocopying and microfilming, and single item conservation treatment. This work has been funded through a variety of means from individual and organizational donations (such as the University College Alumni organization), state and federal grants (such as New Jersey State Library Preservation Grants, the National Endowment for the Humanities, and NHPRC), and from regular budget funds.

Security

Inadequate security is another preservation issue. The Libraries lose thousands of items every year through theft and mutilation, rendering them useless to patrons. 7,536 books are identified as missing in the online catalog, IRIS, in just one year, 1999/2000.¹³ The Art Library, which houses some of the most expensive books, has over 360 missing books listed in IRIS. Since the libraries do not do systematic inventories or regular shelf reading, this figure represents only books patrons wanted to use but that could not be located. The Libraries have not done enough to make staff aware of the problems of theft and mutilation of materials or trained staff in best ways to prevent them. Security gates are in disrepair.

The primary means of assuring the security of our collections is the use of 3M Security gates. “Tattle tapes” in books activate alarms in the security gates when the books have not been checked out. Most of the 3M Security equipment in New Brunswick is over 10 years old and maintenance contracts have expired as replacement parts are no longer available. Malfunctioning and non-functioning of the security gates is not uncommon in branch libraries.

In facilities for use of rare and archival materials, additional security measure must be taken in the reading room as outlined in Special Collections and University Archives procedures. (See Appendix V: Patron Rules and Regulations, Special Collections and University Archives.)

Conclusions on RUL Current Preservation Activities

The current preservation efforts at RUL are inadequate when considering the preservation challenges we face and when compared with such efforts at our peer institutions. It is clear, however, that these efforts offer a core that can be built on, reorganized, and expanded upon so that we can begin the

¹³ The breakdown of missing books per library is: Alcohol Studies – 40, Alexander – 2,329, Annex – 13, Art – 360, Robeson – 630, Chang – 77, Chemistry – 25, Dana – 1,625, Douglass – 633, East Asian – 12, SMLR – 57, Kilmer – 548, LSM – 529, Math – 37, Music – 384, Physics – 72.

significant reinvestment in knowledge required to keep our collections vital, accessible, and responsive to the needs and aspirations of a great, research and teaching institution.

VII. Recommendations for Developing a Preservation Program at RUL

Systematic, Coordinated Program

- **Establish a standing Committee on Preservation** with a membership that represents all formats, similar to composition of the Preservation Planning Task Force. A standing committee is needed so we can have continuing oversight of all RUL preservation issues and can work on solutions in a systematic and coordinated fashion.
- **Appoint an Interim Preservation Administrator (PA):** In addition the establishment of this standing committee, a PA needs to be appointed who will have operational responsibility for preservation. At this time, however, we do not believe that RUL can conduct a successful national search for a PA because we simply do not offer enough of a program to attract anyone. We recommend instead that a current employee of RUL be appointed temporarily for one to three years to develop such a program by monitoring and facilitating a variety of pilot projects, and developing staffing and budgeting patterns to support a systemwide preservation effort. The primary focus of the interim PA's activities will be in the area of circulating collections where the vast majority of the preservation problems reside. (See APPENDIX V: Position Description for Interim Preservation Administrator.) The PA will report to the AUL/CMD and will work with the standing Preservation Committee. It is not anticipated that the Preservation Administrator would be involved with SC/UA collections. However, the PA and the SC/UA preservationist will have complementary roles especially in the areas of staff training and user education and in fund raising for preservation activities.
- **Hire a Permanent PA:** After this one to three year appointment during which the RUL initial effort will marshal forces to begin a systematic preservation program, the Libraries will seek to hire a permanent Preservation Administrator through a national search.

Other General Preservation Recommendations:

Funding and staffing for a preservation program:

- Preliminary funding and staffing for a preservation program will come from reallocation of current resources.
- Budget requests to the university administration for additional funding should also be pursued.
- External funding will also be carried out with state and federal governmental agencies (where SC/UA and IJS have had success in the past), and private foundations and individuals. Preservation has proven to be a successful area for fund raising at other academic libraries.

We recognize that not all items that are deteriorating, that are damaged, or that have become technologically obsolete can receive treatment. The preservation efforts we carry out must be focused and based on collection priorities. The following recommendations reflect these considerations:

- In selected **areas of unique research strength**, such as Special Collections and University Archives, the Institute for Jazz Studies, and original RUL digital creations, **significant preservation and conservation efforts on a broad front are necessary.**
- **Preservation treatment of individual items in the stacks** will be addressed on a programmatic basis **based on collection strengths and needs.**
- **Identification of items in the stacks in need of preservation treatment** will be carried out by a review of returned circulating materials that are damaged or brittle, and by selectors and teaching faculty reviewing items on the open shelves.
- **Increase cooperative preservation** projects with regional and national efforts. We cannot do it all on our own.
- **Weed materials** no longer needed and **consolidate scattered holdings** of back runs of periodicals and multi-volume sets into one location. By reducing the number of items and locations where material resides, we will focus our preservation efforts and make our collections more coherent.
- While not addressed previously in this report, we strongly recommend that, since preservation programs within academic research libraries support ongoing intellectual access to collections and the tools developed for their use, **there must be a comprehensive plan to create cataloguing records for all items held in RUL collections, including metadata for digital products. Without adequate records to access the objects, we are not preserving them for future use. Recon has been recognized as a top priority for RUL for several years, yet only small scale projects have been undertaken.**

The following recommendations are format specific.

Paper-Based Collections

Environmental and Facilities Monitoring, Surveys, and Upgrades:

- **Monitor facilities** that house library materials with hygrothermographs and visual inspection. Purchase hygrothermographs where needed.
- **Conduct collection preservation surveys** to determine what materials are in need of repair.
- **Utilize collection space more effectively** by consolidating backruns of periodicals and subject-oriented collections into more appropriate locations, and weeding out of unneeded duplicates and unnecessary items. In addition to facilitating the effective access and use of the print collections, this consolidation will create new secure collection areas (such as the non-circulating collection in Alexander Library, a staging area to process large collections, and certain university archival operations like records management), large collection staging areas, and space for preservation laboratories for both digital material (large scanning projects, housing of equipment) and for general book repair. The Kilmer and Douglass libraries offer possibilities for securing space for these activities.
- **Create a non-circulating collection of humanities and social sciences materials that are exceptional and distinctive, such as first editions, which are irreplaceable and frequently brittle, but which do not met the criteria for placement in Special Collections and University Archives.** These items are currently located among our circulating collections and are subject to careless handling and, because of their value, are frequently stolen. The facility would be a secure area located within the Alexander Library. Items in

this restricted collection would be available for use only within this facility and photocopying would be carried out only by authorized personnel.

- Make **the replacement of HVAC system in the Alexander Library** old wing where the stacks, reading rooms, and librarians' offices are located, the highest N.B. Libraries priority in the next round of capital renovations, or seek external funding for this project.

Binding, Repair, and Reformatting of Paper-Based Collections:

In-house Activities:

- **Set up a number of minor book repair workstations** in various locations with circulating collections throughout the Libraries. Such workstations will provide basic but effective and inexpensive book repair. The cost for tools and equipment for such workstations is under \$1,000. (See APPENDIX VI: Tools and Equipment Necessary for Satellite Minor Book Repair Workstations.) **After a few years, explore possibility of establishing a more comprehensive preservation laboratory for general circulating collections.**
- **Expand RUL's REALITI Project** for reformatting brittle books using digital technology. (See Digital Collections below in this section).

Outsourcing Treatments:

- **Review current binding arrangements.** Make sure **written contracts** are consummated with binderies to insure maximizing our binding expenditures. Within one year, bring in three to four binderies to bid on a RUL binding contract. The need to bind periodicals will diminish as we rely more on e-journals. Funding for binding periodicals should be shifted to other preservation activities, such as more book repair, the REALITI Project, other equipment and supply needs, etc.
- Become involved in **collaborative mass deacidification projects** for books with acidic paper that are not yet brittle. The North East Research Libraries Consortium is currently planning such a project.
- Expand RUL's activities in the University of Kansas Brittle Book Project.

Appropriate Handling and Housing of Collections:

- **Train stack personnel in best shelving techniques** for books, journals, musical scores, maps, folios, and other large format materials.
- **Survey and make appropriate changes in housing for paper-based materials.**

Security:

- **Replace security gates.** Begin to replace security gates on an annual basis at the rate of at least 3-5 a year until broken gates are replaced.
- **Provide security training for relevant personnel.**
- **Review security policies throughout the Libraries. Establish appropriate policies for newly developing facilities with archival and other special materials** modeled on Special Collections and University Archives' Patrons Rules and Regulations. (See APPENDIX VII: Patron Rules and Regulations, Special Collections and University Archives.)

- **Audio/Visual Collections**

Sound Recording:

The vast majority of sound recordings owned by RUL is commercially produced and, when worn out, can be replaced, if supplies are still available. **The primary preservation efforts for these media can be made by simply following some very basic rules of storage, handling, and playback.** (For a detailed listing of rules of storage, handling, and playback of sound recording, see VIII: Basic Rules of Storage of Sound Recordings, and Basic Handling and Playback Rules.)

For archives like the Institute of Jazz Studies and Special Collections and University Archives that contain rare, fragile and irreplaceable sound materials, it will be necessary to reformat (re-recording the sound content from a deteriorating format onto an archival format). Currently only the Institute of Jazz Studies has a sound lab capable of making archival copies of deteriorating sound materials and even they do not have everything a well-stocked sound lab should have (e.g., a record cleaning machine, a convection oven for baking sticky shed tapes prior to reformatting them). Also, there are no qualified audio engineers on the Rutgers University Libraries staff to do the reformatting. Work will either have to be outsourced to a local sound studio or the IJS sound lab must be fully equipped and must have a full- or part-time audio engineer hired to do re-recording projects. Procuring grant funding is possible, but not a certainty. Recently the Equipment Leasing Fund has made it possible to acquire several pieces of equipment related to analog-to-digital conversion and digital editing equipment that will facilitate certain aspects of sound recording preservation. **The IJS sound lab will serve as a system-wide resource for sound preservation.**

Basic preservation measures will have to be implemented system-wide, which will involve holding workshops to train staff in the proper storage and handling of sound materials. Even if the sound lab at the Institute of Jazz Studies is not fully equipped to deal with all problems, certain tasks can be performed there (e.g., splicing a broken tape, adding leader tape to open reel tape, re-recording an acetate tape onto a polyester tape, putting a cassette tape into a new housing, re-recording an often used LP onto CDR, duplicating a videocassette, etc.).

Moving Images:

Plans to preserve film at Rutgers are focused on the unique film collections in Special Collections, and the Institute for Jazz Studies, not on the commercial titles held by Media. However, research in film preservation shows that **small changes in storage conditions can result in considerable life extension for film collections, temperature control being the most important.** Therefore, for both long and short term approaches to preservation, efforts would appropriately incorporate cleaning, proper storage (on the round, not on the side), and proper storage temperature, as cool as possible.

Digital Collections:

RUL has created several important digital projects for which there are significant preservation issues. (For a list of current digital projects at the Scholarly Communications Center, see

APPENDIX IX : Digital Projects in the Scholarly Communication Center.) The following recommendations are based on the premise that we must begin the digital preservation process by doing and learning. There is much to be done in the way of policies, procedures, technology, and standards. By initiating a digital preservation process, we will continue to learn and there will be much iteration as we improve the process. The recommendation is in two parts:

- **Form an RUL Digital Archiving Group**

This group would be created from those who are working in relevant areas and should include representatives from the SCC, Special Collections, Library Systems, Dana's Media Services, eventually Dana's CIIT, and the new AUL for Digital Library Resources. In addition, one member of the group should have budget and time available to dedicate half-time to leading the group and launching RUL's digital preservation process. The initial responsibilities of the group would be to do the following:

- Establish a statement of goals and objectives
- Define the types of digital objects that will be preserved
- Define the criteria for preservation:
 - Frequency of use
 - Difficulty of migration
 - Research value and uniqueness
 - Best of its kind
 - No one else able to preserve the object
- Prepare a policy statement that includes the above
- Define the processes and steps required for each digital object:
 - Selection of specific digital materials
 - Creation of metadata
 - Determination of extent of digital document (e.g. database, html, "look & feel," images, etc.)
 - Define archival formats (e.g., PDF) and medium (e.g., CD, optical disk, etc.)
 - Review access rights and security
- Launch a trial to begin the preservation process
- Collaborate with others, initiate forums, etc., to accelerate the learning process
- **Create a Digital Preservation Laboratory:**

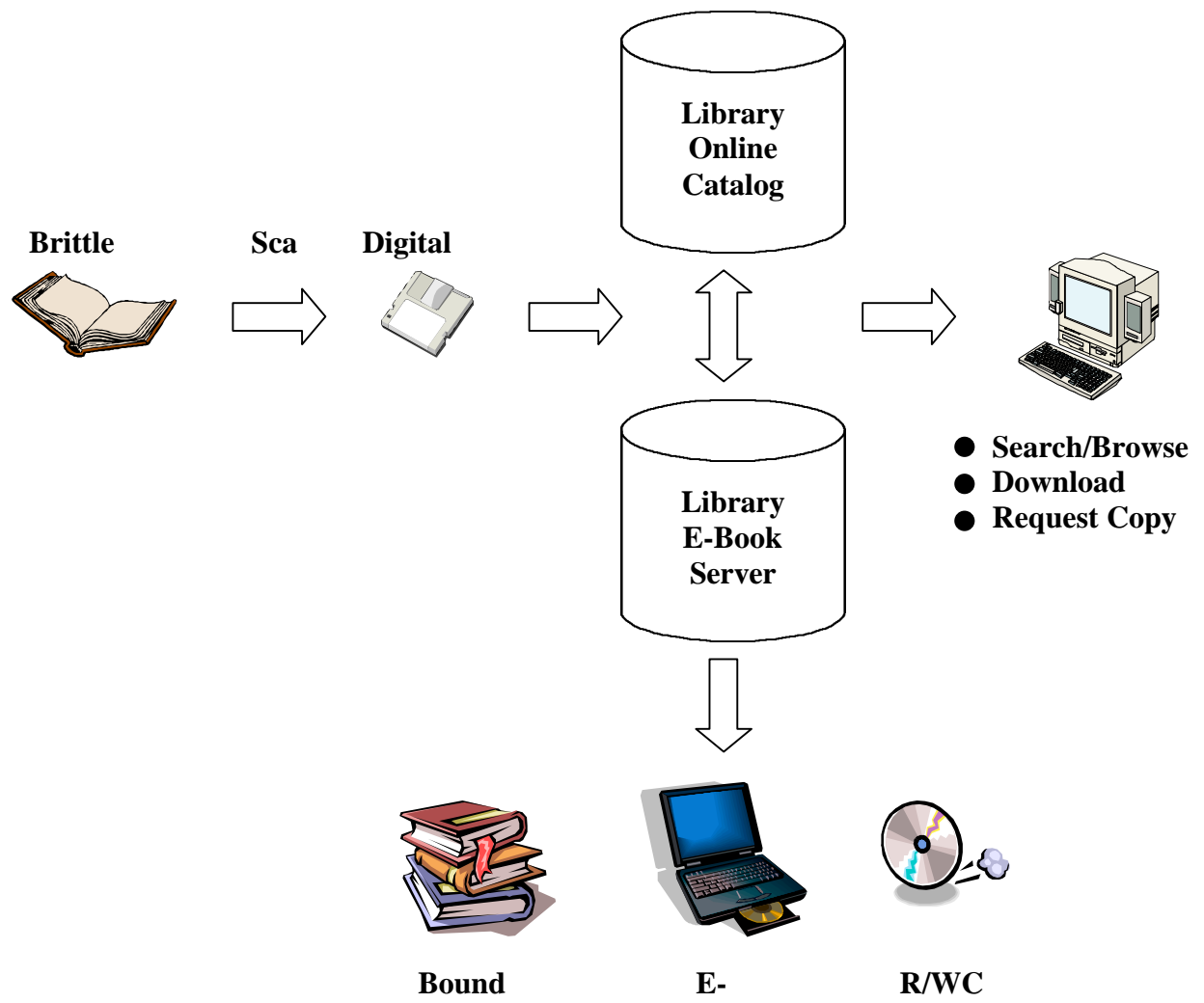
This laboratory would include the staff and technology to support the trial as discussed above and to continue the research which would lead to improved processes and technology. In a sense, the Laboratory provides the R&D for digital preservation while the Digital Archiving Group deals with the current process and operational details of preserving our digital materials. A single workstation equipped with appropriate peripherals (e.g., high resolution digital cameras, scanners, video capture, fast CD writers, lots of mass storage) could serve as the initial starting point for the required technology. Given the work of the SCC, the laboratory might be located there; it is possible that the Learning Links computer could serve as the initial technology for the preservation laboratory.

- A migration and refreshing plan for CDs, DVDs, and diskettes should have the following components:
 1. Identify the media that will not likely be preserved elsewhere. For example, ICPSR can generally be counted on to archive census data. Some of our data CDs are serial with a new release that is cumulative appearing every year. We would not have to refresh these types of media.
 2. Prepare preservation metadata that identifies when the CD was created. Frequently the dates on the recorded media will be sufficient.
 3. As part of the metadata, record the last refresh date and the next anticipated refresh date.
 4. Define a process for each type of media that would include an early warning system that alerts the preservationist to the need for refreshing, rewriting the media and testing for basic sanity of operation and integrity of the digital data. Ownership for this process should be clearly identified within the library.
 5. Depending on the volume of CDs, the library should consider purchasing equipment that will handle CDs in volume.
 6. Although the library would be making a copy to replace the original, it is always good to check copyright issues.
 7. In some cases, the media will have already failed. Depending on the digital object, it may be useful to retrieve the data using tools that are provided by companies such as Norton.

- Grant Funded Work – REALITI Project

Two members of the Preservation Task Force (Hancock & Jantz) have been developing a grant funded project that would get us started in exploring and using digital preservation techniques, as well as address the brittle book problem. The focus of the project is on the end-to-end process that would provide preservation, access, and usability to a unique collection of materials within RUL. The step-wise process is as follows (also refer to the attached diagram):

- Select brittle books
- Scan
- Store on server
- Provide access via Web
- Enable ebook and online reading
- Provide for binding and printing books
- Digital output formats include e-books and CDROMs
- Enter bibliographic record in IRIS with direct linking
- Allow for request of brittle book to be scanned



APPENDIX I: Preservation Planning Task Force Charge

PRESERVATION PLANNING TASK FORCE

Background:

The 1987 “Slow Fires” T.V. special and video on the deterioration of books due to the acidic content of its paper caused great concern about survival of the “human record.” The issues related to the survival of that record in electronic format are equally, if not more, problematic and pressing.

We are standing at a critical junction in the evolution of research libraries. We are the custodians of massive amounts of physical objects, primarily in paper format, and are negotiating an explosion of information in electronic formats. One of the primary functions of a research library is to preserve human knowledge and the information that is needed to create that knowledge. The Rutgers Libraries must determine their role in preservation: 1.) what should they preserve? and 2.) how should they preserve it?

Just as with the selection of current material, selection of items for preservation depends on local programs, the institutional mission to state as well as national and international responsibilities. Another related preservation issue is whether to preserve the physical object or its intellectual content.

There are two broad categories related to how to preserve resources: 1.) repair or preserve the physical object or 2.) reformat: replace, photocopy, microfilm, digitize, and “refresh” and “migrate” for electronic resources.

Different media present different preservation issues:

Paper based medium: 1.) chemical deterioration primarily of paper due to high acidity of paper or ink (the “brittle books” problem), and 2.) wear and mutilation through use and abuse.

Electronic media: 1.) instability of medium itself, 2.) rapidity of obsolescence of hardware and software, and 3.) uncertainty as to how to archive digital information and as to who has the responsibility for archiving.

Visual (photographs, motion pictures, and videos) and audio media:

Chemical deterioration of visual media and deterioration of magnetism in audio media as well as the obsolescence of technology.

Charge:

1. Review preservation organizations at comparable research libraries.
2. Recommend a plan for RUL that includes the following:

- Desirability of appointing a **Preservation Officer** to oversee a system-wide preservation program at RUL. Responsibilities to include: ongoing development and implementation of the program, education of faculty and staff on preservation issues, and training of technicians.
- Desirability of establishing a **Preservation Laboratory** as a clearing house for preservation issues and activities. What should be the extent of the activities: repair and conservation of materials, reformatting through photocopying, binding of paperbacks, microfilming, scanning and other forms of digitization? Should the Preservation Lab in Special Collections and University Archives be expanded to accommodate all of these activities or should a new site be developed? What preservation activities should be outsourced? To what extent should digital activities related to preservation take place in a central lab or in other locations such as the SCC and Dana's CIIT?
- What are the **Priorities and Criteria** for selecting objects for preservation related to current use (items in circulation or currently being used that are in need of repair, binding, scanning, refreshing, etc.), and ongoing or future use (items that we foresee as necessary to retain to support the programs at Rutgers in the future and to preserve Rutgers' unique contribution to the human record).
- What environmental factors must be addressed and what are the most effective ways to solve them?
- An important aspect of the preservation of the human record, the legacy of libraries, is access to information about what is preserved (metadata such as cataloging records, Dublin core, etc.). Make recommendations for such metadata.
- In addition to preserving individual items in paper format, part of our legacy is how we leave the print collections for future generations. Should we consolidate collections in the most logical, accessible fashion or in the most space efficient fashion? Should we be shifting material that is rare or fragile in the open stacks into more secure and climate controlled facilities?
- Wherever possible, describe benefits and disadvantages of these activities and their financial implications. Address how much funding is needed for a preservation program and identify possible sources of funding, such as reallocation of existing resources and fundraising.

Place your recommendations in priority and suggest how to phase in the overall plan.

The Task Force should meet as a group at least once a month. A report with recommendations should be completed by March 30, 2000.

Be prepared to participate in a forum on these issues during the spring semester following the completion of the report.

Membership: Ron Becker; Harriette Hemmasi; Ron Jantz; Vincent Pelote; Brian Hancock; Kristen St. John; Robert Sewell, Chair; Jane Sloan; Farideh Tehrani

APPENDIX II: Detailed Reports on Preservation Activities at the University of Michigan, Pennsylvania State University, and the University of Iowa

University of Michigan

Carla Montori, Head, Preservation Division

The University of Michigan has the largest Preservation Department of the three universities surveyed. The Preservation Division formerly reported to Technical Services, but their reporting line is in flux due to personnel changes. The Division is split into two sections: Conservation Services and Preservation Support Services.

The *Conservation Services* section is divided into three areas: Bindery Preparation, Book Repair, and Conservation.

- Bindery Preparation has three FTE positions. This area manages all library binding for the libraries, but shelf preparation is not done for returning materials. Serials comprise 60% of the material that is bound, although these numbers are beginning to fluctuate. 80% of all pamphlet binding is done by the library binder and the binder is beginning to provide paperback re-enforcement as well. UM has a three-year library binding contract with a single vendor with a possibility of a two-year extension.
- Book Repair employs 4 ½ FTE and works on general collection materials. The unit focuses on repairs and treatments that are not appropriate to send to the library binder. There is no quota to limit how much branches can send in.
- Conservation works on special collection material (including books, papyrus, photographs, and art on paper) and employs 4 ½ FTE. The unit controls workflow by using a negotiated points system similar to that at the Library of Congress. A curator or collection is assigned a specific number of hours of conservation time at the beginning of a fiscal year. When the hours are assigned the curators and conservators meet to determine which projects will be worked on for the upcoming year.

Preservation Support Services includes Reformatting and Replacement, Administration and Management Support, and Mass Deacidification.

- Reformatting and Replacement currently employs 11 ½ FTE, and has two workflow streams, one based on soft money/grant projects and the second based on hard money. The staffing for the grant projects fluctuates according to the needs of the particular grants at the time. The hard money program reformats brittle materials that are identified by circulation staff. Preservation staff evaluates the identified material for the “worst of the worst” and does a search for a copy in a stable format (either acid-free photocopy or preservation quality microfilm). If they cannot find a copy to purchase, they have an in-house capability of microfilming or conversion to digital format or photocopy. The choice of reformatting type is left up to the selector or bibliographer.
- Administration and Management Support employs 3 FTE. Tasks include ordering and entering acquisitions in their innopac system, environmental monitoring, disaster recovery and response, serving as liaison with facilities and budget tracking.
- The Mass Deacidification program is relatively new with 1/3 FTE position. This is an endowed program. The deacidification program is collection based with priorities chosen by a university library-wide Collection Management and Development Council. This council

identifies collections of significance. The collections are then tested for brittleness by the preservation employee. The materials are sent to PTI and deacidified by the Bookkeeper process.

The budget for the Preservation Division is approximately \$1.75 million. They receive university book funds, general funds, grants and endowed funds. There are two specific endowments: one for the mass deacidification and another that supports 1 ½ staff positions. They also have a discretionary fund, which the Preservation Division itself fills, and controls according to income generated from their own projects. Current grants are from the NEH, the Mellon Foundation, and consortia to which the University of Michigan belongs.

The Pennsylvania State University Sue Kellerman, Head, Preservation Department

Penn State has the newest preservation program of the three examined. It has only been a department since 1995. Prior to this time the preservation efforts at Penn State consisted mainly of commercial binding. In 1995 a reorganization occurred that moved staff and a supervisor from commercial binding. Staff lines were added for collections care (book repair) and scanning. Last July through library development efforts a position for the head of the Preservation Department was endowed. At the moment a new preservation lab is being built in a renovated space of the Pattee Library.

Penn State organizes its preservation program into four areas: Commercial Binding, Collections Care, Digital Scanning (for Preservation Purposes), and Preservation Microfilming.

- In the Commercial Binding area there are seven FTE positions with two work-study students. Last year Penn State sent 44,345 volumes to the library bindery, but has seen a shift in what they are sending. The number of periodicals is decreasing while the number of theses is increasing. As the numbers change employees are being cross trained in other areas of preservation. Beginning in January of 2000 Commercial Binding has instituted a “whole book treatment” project where 100 volumes/month are sent for rebinding, then sent from the binder to PTI for mass deacidification, and then sent back to Penn State. They have been using PTI for mass deacidification for the past 6 or 7 years with a budget line from endowed funds.
- The Collections Care unit is staffed by one FTE position and two .5 FTE employees. Books are identified by circulation. The unit provides modest repairs, such as tip-ins, page replacements, and pamphlet bindings, while volumes requiring more substantial repair are sent to the commercial binder for rebinding. Currently special collection needs are addressed through boxing done by the commercial binder (15 items/week), but the Preservation Department is hoping to hire a conservator once the renovation of their space is complete. Reformatting of material through Digital Scanning and Microfilming is done in house. Microfilming projects are all externally funded and there is no budget line for this activity. A current project is being funded by the NEH and employs .5 FTE. Reformatting by digital scanning has been done at Penn State since 1992. Scanning is done on brittle books (identified by selector) with a paper copy going to the stacks. In addition, some out-of-print books are also scanned at selector request. Preservation also participates in special digital projects by providing scanning, but not the supporting web sites or metadata.

The budget for Penn State preservation efforts comes from a combination of university, grant, and endowment funds and is approximately one million dollars. In addition to the positions listed above, the Head of Preservation also has a support assistant who orders supplies and keeps track of budgets.

University of Iowa
Regina Sinclair, Preservation Librarian

The Preservation and Conservation Department at the University of Iowa is composed of four areas: Binding and Marking, Book Repair, Conservation, and Assessment and Reformatting.

- Book Repair employs one full-time Library Assistant III and has been allocated 70 student hours. This unit focuses on circulating collection repair as opposed to the Conservation area, which addresses Special Collection needs.
- Staffing levels in the Conservation unit are currently at 2 FTE, one of whom is the supervisor and the other position is an apprentice in the middle of a four-year appointment. The Conservation Unit also draws interns and practicum students from the library school and the Book Arts program at the University of Iowa. This semester they will have 80 hours of practicum student help.
- The Binding and Marking Unit has four FTE positions who coordinate all of the library binding and in-processing (for new and rebound materials) for the main library and 11 branches at the University of Iowa.
- Assessment and Reformatting is staffed by one employee who is involved in a wide range of activities. The employee evaluates all material sent to preservation for repair, processes newspapers for microfilming (13 to 15 selected titles regularly microfilmed including *The Daily Iowan*), orders replacement pages, and identifies brittle books. Iowa's brittle book program currently consists of shrink wrapping the fragile volumes so they can return to the shelf with some protection from handling. The Preservation Department is not involved in scanning projects, but one pilot project is being considered.

APPENDIX III: Inventory of Sound, Moving Image, and Magnetic Tape Collections in RUL

Institute of Jazz Studies:

The Institute of Jazz Studies (IJS) housed on the fourth floor of John Cotton Dana Library on the Newark campus is one of two major archives in the Rutgers University Libraries system. The collection contains over 100,000 commercial and non-commercial sound recordings. The commercial formats include wax cylinders, 78 r.p.m. discs, EPs (extended play), LPs (long play), 45 r.p.m. discs, and CDs. Included in the collection are large numbers of non-commercial lacquer discs.¹⁴ Magnetic sound carriers in the IJS collection include open reel tapes, audiocassettes, and digital audio tapes (DATs). These are mostly non-commercial and like the lacquer discs, make up the most rare and irreplaceable recordings in the collection. Videotape is also magnetic tape and the IJS has over 300 videocassettes in its collection, both commercial and non-commercial. The collection is accessible to all but it is non-circulating.

Blanche and Irving Laurie Music Library:

The Blanche and Irving Laurie Music Library located in the Mabel Smith Douglass Library on the Douglass Campus has a collection of approximately 15,230 LPs. Rounding out that collection are approximately 4,000 CDs and 320 videos. Sound recordings and videos circulate for a period of 14 days to faculty and graduate students in the music program only.

Media Services (Kilmer Library):

Media Services, located in the Kilmer Library, has in its collection 1,829 LPs; 3,575 audiocassettes; 5000 videotapes; and 150 laser discs. Materials are to be used in this unit only and may not be checked out except by faculty for instructional use on campus (one-day loans).

Media Services (Dana Library):

The Media Collection at the John Cotton Dana Library on the Newark Campus has approximately 4,000 LPs in its collection. The 1,500 audiocassettes, over 70 CDs, and approximately 800 videocassettes round out this collection. All Rutgers University students, faculty and staff may borrow audiocassettes and CDs. Videocassettes and LPs must be used on-site, but faculty can borrow videocassettes for classroom use.

Special Collections and University Archives:

Special Collections and University Archives has a significant collection of machine-based audio/visual records including moving image material (film & video) and audio (magnetic media & discs, etc.). These items, like most SC/UA collections, are unique and irreplaceable. Sound recordings and moving image materials fall within the collecting scope of the unit as it applies to the overall mission of SC/UA. Although the physical format differs from manuscript material,

¹⁴ This sound carrier consists of a metal, glass, or fiber base coated with a thin layer of lacquer, made of acetate or cellulose nitrate, into which the grooves are cut. These instantaneous discs could be one-sided or two-sided and were usually pressed in limited quantities (in most cases only one copy exists). They were intended for direct reproduction without further processing and were not meant for public dissemination. These make up the most rare and irreplaceable recordings in the collection.

the same appraisal, collection development, and descriptive criteria apply. Unlike other library collections these holdings are archival in nature.

The following breakdown reflects larger groupings of A/V materials within Special Collections and University Archives with a majority of these non-text archival formats falling in the University Archives division of the unit. However, there are videos, films, and sound recordings interspersed throughout many individual manuscript collections.

Moving Image Material:¹⁵

- A. Rutgers Forum (OTR): 500
- B. Symposia (OTR): 500
- C. Athletics: 500
- D. Academic: 175
- E. MGSA: 50
- F. General Collections: 250
- G. From Media Svcs.: 50
- H. Misc.: 150
- Total: 2,175**

Sound Recordings: 1,000¹⁶

Total A/V: 2,675 items

¹⁵Estimates are predominantly from the University Archives with Special Collections material in the General Collections category. Formats include, but are not restricted to: 8mm; 16mm; 35mm films; 3/4" U-matic video; 1" open reel video; VHS; and Betacam (various versions).

¹⁶Sound recording materials include, but are not restricted to, various sizes and speeds of open reel magnetic tape, cassettes, long-playing records, and transcription discs. Please note that oral histories are included in this category, which is based on format and is NOT restricted to music material.

APPENDIX IV: Problems Unique to Sound Collections

Formats:

Discs:

Generally speaking, all grooved phonodisc collections suffer from some degree of wear. All discs with grooves are damaged every time they are played. The heat generated by the friction of the playback stylus riding in the groove walls of the disc temporarily deforms the grooves. That is why a disc should be allowed to rest 24 hours between one play to allow the grooves to cool down and return to their normal shape. Shellac discs (78s), some early LPs, and glass-based lacquer discs are susceptible to breakage. Warping can also occur, especially with vinyl LPs. Otherwise, shellac has proven to be relatively stable while vinyl has proven to be the most stable of the materials used in sound recordings. Lacquer discs, unfortunately, are the least stable sound recordings. A problem common to lacquer discs is delamination. Shrinkage of the lacquer coating due to loss of castor oil plasticizer causes progressive embrittlement. Because the coating is bonded to a core that cannot shrink, internal stresses result. This causes the thin coating of lacquer, which contains the sound content, to crack or peel away from the metal, glass, or fiber base. Also, as nitrocellulose decomposes over time, it reacts with water vapor or oxygen and produces acids that act as a catalyst for a number of other chemical reactions.

The sound on compact discs is captured and reproduced digitally; therefore, using a completely different technology than analog grooved phonodiscs. A laser reads the digital information on a CD causing no wear on the disc no matter how many times it is played. Life expectancy numbers for CDs are still in question, but most experts believe they should last at least 30 to 50 years. Some will undoubtedly last longer than others depending on the production values of the manufacturers of the discs.

Magnetic Tape:

The thing to remember about magnetic tape is that it is made up of two layers: a base layer, and a thin binder layer that is bonded onto the base. The binder contains ferromagnetic particles whose permanent alignment within the binder produces the copy of sound waves. The chemical composition of the binder (which differs from manufacturer to manufacturer), as well as the uniformity and smoothness of application, affects audio quality, noise level, tape-to-head contact, and friction. These factors also affect the tape's aging properties.

Polyester polyurethane is the most common binder resin in use today. The most common ferromagnetic particle in use is gamma ferric oxide; cassettes use chromium dioxide. Other additives used within the mix to improve the tape's performance include solvents, wetting agents, plasticizers, stabilizers, and lubricants.

The most common and serious magnetic tape degradation occurs through a process called hydrolysis. This takes place when the binder resin consumes water drawn from the humidity in the air to liberate carboxylic acid and alcohol. This results in the binder shedding a gummy and sticky material that causes tape layers to stick together and interferes with playback when it is deposited onto the tape recorder heads. The condition is commonly known as sticky shed syndrome. The added friction increases tape stress and can cause machines to stop. Hydrolysis

also causes a weakening in the bond holding the binder to the backing of the tape, resulting in shedding or possible detachment. Cassettes, made of chromium dioxide, are especially susceptible to this condition. Other problems are dropouts (a momentary loss of signal), caused by incomplete dispersion of the ferromagnetic particles; a weak bond that causes the binder to separate from the backing; lubricants that evaporate to the point where tapes are unplayable; fine oxide powders that shed from the tapes and deposit onto heads, inhibiting playback.

The tape backing is the structural support of the tape. It must resist stresses imposed by playback and storage without becoming permanently deformed (a condition known as stretching), or losing dimensional stability (caused by the absorption of moisture or heat). Most magnetic tape backing has been made of either cellulose acetate or polyester—materials that have very different physical and aging properties.

Cellulose acetate-backed tapes, or acetate tapes, were manufactured from 1935 until the early 1960s. The Institute of Jazz Studies has quite a number of these tapes. They rely heavily on plasticizer additives for suppleness, and these plasticizers tend to evaporate and crystallize over time. These acetate tapes have extremely low tensile strength and break easily. Tape curling and edge fluttering are other conditions common to acetate tape caused by the absorption of humidity and heat. These physical distortions greatly affect the tape-to-head contact and, in turn, affect audio quality.

Polyester-backed tape, or mylar tape, came into use in the early 1960s and quickly replaced acetate tape. Polyester is very stable, but polyester-based tape has a high tensile strength that can cause tape to stretch irreparably (instead of breaking cleanly and reparably like acetate tape).

Videotape (e.g., videocassette) is also magnetic tape and therefore susceptible to the same problems as audiotape.

APPENDIX V: Position Description for Interim Preservation Administrator

Reporting to AUL for Collection Development and Management

General oversight responsibilities for preservation activities related to circulating collections:

- Responsible for system-wide training related to handling of library materials, security procedures, disaster planning and emergency response, basic book repair.
- Develop plans for preservation of circulating collections including collection facilities, space, and housing, identification of library materials in need of attention, setting up mini-workstations for book repair in branch libraries, and major preservation laboratory for circulating collections.
- Develop plan for staffing and budgeting for general preservation program.
- Oversight of collection management and collection space allocation with direct line responsibility for New Brunswick collections and coordination with Newark and Camden
- Responsible for binding operations in New Brunswick and oversight over binding contracts system-wide.

Specific Projects:

- Develop secure area within Alexander Library for special materials held in open stacks but not falling into criteria for placement in Special Collections and University Archives.
- Conduct review of current binding operations and relations with binderies with intent to consolidate, where possible, binding activities within the Libraries and with outside contactors.
- Work on REALITI project.
- Expand RUL's participation in University of Kansas' Brittle Book Project.
- Investigate mass deacidification projects.

Will work in coordination with SC/UA preservationist where appropriate, such as in training, developing standards, and preservation surveys.

APPENDIX VI: Tools and Equipment Necessary for Satellite Minor Book Repair Workstations

Item	Supplier	Number	Cost/item	Total Cost
Tools				
metal ruler 18"	Talas	1	\$5.95	\$5.95
metal ruler 12"	Talas	1	\$4.95	\$4.95
cutting blade	Talas	2	\$8.39	\$16.78
sharp point knife	Talas	1	\$9.75	\$9.75
self healing mats 24 x 36	Talas	1	\$28.50	\$28.50
self healing mats 9 x 12"	Talas	1	\$9.20	\$9.20
tweezers	Talas	1	\$13.25	\$13.25
shears/scissors	Talas	2	\$18.95	\$37.90
small scissors	Talas	2	\$24.75	\$49.50
bone folder	Talas	4	\$5.00	\$20.00
microspatula	Talas	4	\$2.50	\$10.00
glue brushes 1/2"	Talas	1	\$4.10	\$4.10
glue brushes 1"	Talas	1	\$8.40	\$8.40
weights - bags	Talas	4	\$9.50	\$38.00
weights - cast iron	Talas	4	\$15.95	\$63.80
awl	Talas	1	\$4.49	\$4.49
Total for tools				\$324.57
Equipment				
nipping press	Talas	1	\$445.00	\$445.00
pressing boards	Talas	1	\$32.50	\$32.50
tacking iron	Talas	1	\$74.10	\$74.10
Total for Equipment				\$551.60
Total for Equipment +Tools				\$876.17

APPENDIX VII: Patron Rules and Regulations, Special Collections and University Archives

PATRON RULES AND REGULATIONS SPECIAL COLLECTIONS AND UNIVERSITY ARCHIVES

Welcome to Special Collections and University Archives. In order to insure the preservation of our collections for you and those who follow, we ask that you follow these simple rules.

GENERAL INFORMATION

The New Jersey Room is specifically reserved for patrons using Special Collections or University Archives holdings.

Materials do not circulate and must not be removed from the reading room (microfilm excepted).

Necessary conversation must be in low tones to avoid disturbing others.

Eating, drinking, or smoking in the reading room is prohibited.

REGISTRATION

Patrons must register and sign in [and out] at the information desk in the New Jersey Room.

Patrons must stow coats, bags, packages, briefcases, hats and umbrellas in the coat room (lockers are available). Only necessary paper and reference materials are permitted in the reading room.

Belongings are subject to search before leaving and must be retrieved by 5pm.

USE OF MATERIALS

Patrons must use pencil; pens are prohibited. Pencils are available at the reference desk. Do not mark, erase, lean on or write on any materials.

Items in envelopes or folders must be kept in the order they are arranged. Please advise reference personnel of misplaced or missing items.

Patrons wishing to use manuscript collections, university records, rare books or Genealogical Society of New Jersey (GSNJ) materials, must complete a yellow application form available at the reference desk. Requests are limited to five items at a time, and a separate call slip must be completed for each item or collection.

Some collections or parts of collections may contain restricted materials. Application forms for permission to use restricted materials may be obtained at the reference desk.

Materials can be paged until 4:45 pm. Return paged materials to the reference desk, and place New Jersey Room items on the book cart. **DO NOT RESHELVE MATERIALS.**

REPRODUCTION OF MATERIALS

Some materials may be copied by patrons. A copier is located in the New Jersey Room and only takes a copicard. Copicards are sold at the Copy Center on the lower level of Alexander Library around the corner from SC/UA. During busy periods, photocopying is limited to ten minutes.

Some materials may only be copied by the SC/UA staff. A copy of the policy and directions requesting copies may be obtained at the reference desk.

Some materials may not be photocopied at all, including: Rare books (X), folios, fragile, oversized, and bound manuscripts. Consult the reference personnel regarding possible alternatives. In some cases photography may be an option.

SPECIAL REQUESTS

Patrons wishing to use SC/UA microfilm must use the microfilm reader/printers in the Microfilm Reading Room on the lower level in the new wing beyond the Copy Center. Some form of identification must be left at the reference desk, and SC/UA microfilm must be returned to the New Jersey Room before 4:45 pm.

Patrons wishing to use items housed in the Library Annex must make the request 72 hours in advance to allow for delivery. The Annex is closed on weekends.

Revised 1/99

APPENDIX VIII: Basic Rules of Storage of Sound Recordings, and Basic Handling and Playback Rules

- Store all sound recordings vertically on metal shelves with partitions every 4 to 8 inches. Shelving should be an inch and a half deeper than the sound recordings.
- Store materials in the proper environment with respect to temperature and humidity (e.g., 60 degrees Fahrenheit/50% relative humidity), but most importantly, keep whatever temperature and humidity agreed upon constant.
- Store sound recordings away from direct sunlight. Ultraviolet light fixtures should have filters to prevent damage from ultraviolet rays.
- LP discs should be stored in polyethylene-lined sleeves with the sleeve opening facing the top of the jacket. CDs and cassettes should be stored in plastic cases.
- Shrink-wrap on LP record jackets should be removed. Polyethylene outer sleeves should be used whenever possible to protect LP jackets.
- 78 r.p.m. discs and lacquer discs should be stored in archival quality sleeves.
- Open reel tape should be stored in archival containers.
- Videocassettes should be stored in archival containers.
- Store all tape away from magnetic fields that can result in erasure of the tape.
- Open reel tape should be stored tails out on the take up reel. This is accomplished by letting the tape play through at its normal playing speed and leaving the tape on the take-up reel.

Basic Handling and Playback Rules

- LPs and CDs should be removed from their containers and placed on the playback unit without touching the grooves. Use cotton gloves.
- Dust should be removed from LPs before and after each playing.
- Discs are prone to static build-up. A static pistol will alleviate the problem.
- Handle open reel tapes by their hubs.
- Make sure all playback equipment (e.g., turntables, CD players, tape machines) is in good working order.
- Clean and demagnetize audiotape heads when needed. Clean videotape heads at the first sign of snow in the picture.
- Make sure stylus is not chipped or broken.

APPENDIX IX : Digital Projects in the Scholarly Communication Center

Alcohol Studies Database

Name: Alcohol Studies Database

Access: Public domain

Compiler: Center for Alcohol Studies

Owner: Center for Alcohol Studies

Archiver: RUL

Type/Format: reference database/MS-Access

Metadata: N/A

Criteria: valuable research information

RUL Archive? not likely that it will be preserved by others

Process: annual snapshot of data, questionnaires, and web/coldfusion code

Migration: migrate materials when a change in technology occurs

Medieval Early Modern Databank

Name: Medieval Early Modern Databank

Access: Public domain

Compiler: Various researchers

Owner: ???

Archiver: RUL

Type/Format: reference database/MS-Access

Metadata: N/A

Criteria: valuable research information

RUL Archive? not likely that it will be preserved by others

Process: annual snapshot of data, and web/coldfusion code

Migration: migrate materials when a change in technology occurs

Eagleton Public Opinion Polls

Name: Eagleton Public Opinion Polls

Access: Public domain

Compiler: Eagleton Institute

Owner: Eagleton Institute

Archiver: RUL

Type/Format(s): statistical data/spss/pdf documents

Metadata: survey questionnaires

Criteria: valuable research data

RUL Archive? not likely that it will be preserved by others

Process: annual snapshot of data, questionnaires, and web/coldfusion code

Migration: migrate materials when a change in technology occurs

New Jersey Environmental Digital Library

Name: New Jersey Environmental Digital Library

Access: Public domain

Compiler: SCC through NJDEP Grant

Owner: ???

Archiver: RUL

Type/Format: digital archive/MS-Access/PDF/Images

Metadata: N/A

Criteria: valuable research and public information

RUL Archive? not likely that it will be preserved by others

Process: annual snapshot of data, documents/images, and web/coldfusion code

Migration: migrate materials when a change in technology occurs