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National Archives and Records Service (NARS) Twenty Year Preservation Plan

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National Bureau of Standards
National Engineering Laboratory
Center for Applied Mathematics
Gaithersburg, MD 20899

November 1984

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National Archives and Records Service
Washington, DC 20408

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U.S. DEPARTMENT OF COMMERCE, Malcolm Baldrige, *Secretary*
NATIONAL BUREAU OF STANDARDS, Ernest Ambler, *Director*

NARS Twenty Year Preservation Plan

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NARS TWENTY YEAR PRESERVATION PLAN

Executive Summary

The National Archives began operation in 1934. At that time, some of the documents placed in its custody were over 150 years old and had been in storage in different agencies under a broad variety of changing conditions. In 1984, there are 3.24 billion pieces of paper comprising 1.35 million cubic feet of records plus 25.3 million non-textual items -- such as motion pictures, still photos, sound recordings, machine-readable records, etc. -- in the permanent collection of the National Archives.

Until recently, preservation of textual (paper) records was, by and large, performed on an ad hoc basis -- thus it was impossible for the benefits of economies of scale to accrue and there was no assurance that preservation was being performed in any relation to actual need.

Conservation of paper materials is a young and developing art. Knowledge of materials and techniques have improved markedly in recent years. Occasionally it is necessary to undo and/or redo earlier repair efforts (a prime example is the previous application of pressure-sensitive tape).

Since non-textual items have received priority preservation treatment in the past and are well preserved, for the most part, this plan primarily addresses the preservation needs of textual items. Much of the supporting data for developing the plan was developed by the Statistical Engineering Division and the Operations Research Division, Center for Applied Mathematics, National Bureau of Standards, under interagency agreements with National Archives and Records Service (NARS). The statisticians developed and executed a scientific survey of the textual holdings of NARS. This survey recorded characteristics such as paper quality, format, current storage needs, intrinsic value, frequency of use, potential for damage and extent and urgency of needed preservation services. The operations research analysts developed a conceptual model for identifying preservation alternatives based upon type of document, current conditions and expected use. The operations research analysts utilized the survey results, reports produced in earlier NARS studies, interviews with staff, and observations of operations within NARS reference and preservation functions as basic sources of data for developing the preservation plan for textual (paper) records.

The goals of the plan are:

PRESERVE THE DOCUMENTARY HERITAGE OF THE UNITED STATES AND PROVIDE TIMELY SERVICE TO BOTH GOVERNMENT AND SCHOLARLY RESEARCHERS.

These goals and the requirement that NARS operate within its budgetary constraints lead to the following strategy for developing a preservation plan:

- o Allocate preservation resources according to need and use
- o Slow down natural aging of documents in storage by improving storage environment and performing holdings maintenance
- o Recopy rapidly deteriorating stencil Mimeograph, Thermofax and Verifax media as soon as practical
- o Reduce routine preservation laboratory work as much as possible to make room for servicing national treasures
- o Prevent accumulation of any future holdings maintenance backlog by performing comprehensive holdings maintenance at time of accessioning

THE PRESERVATION PLAN IS PREDICATED UPON THE NECESSITIES OF PRESERVING DOCUMENTS, SERVING RESEARCHERS, AND HUSBANDING SCARCE RESOURCES.

For documents subjected to very infrequent use, which is the usual case for archival records, deterioration is extremely slow when they are properly housed and are stored in a controlled environment. The proposed plan achieves these conditions through proposed improvements in air temperature and humidity controls and a filtering system to remove deleterious gases. The proposed systematic holdings maintenance program will provide suitable housing for the documents.

Documents subject to damage-in-use, will be identified and protected prior to use by the proposed intercept program. This program is also designed to collect data on an across-branch basis for establishing holdings maintenance priorities and identifying changing usage patterns. This latter collection of enhanced reference service data is a must to provide necessary information for effective preservation management. Proper analysis of data collected during interception could reduce the need for a resurvey of holdings to once every ten to fifteen years.

Documents classified as national treasures will continue to get priority laboratory conservation as they now do under the plan implemented in 1981.

Categories of documents that are deteriorating, such as stencil Mimeograph, Thermofax and Verifax records (circa 1940-1960), will be systematically recopied as soon as practical where they can be found to exist in large contiguous groups. Where these documents are found randomly scattered among other documents, they are to be recopied individually in the holdings maintenance program or the intercept program. The plan calls for performing thorough holdings maintenance at the time of accessioning documents, thus precluding the accumulation of future preservation backlogs.

It should be noted that dollars alone will not get the preservation job done -- personnel positions are also required.

Textual records preservation quantities and costs are as follows:

Holdings Maintenance: 1.9 million cu.ft. @ \$24.40/cu.ft. = \$46.4 million
 Copying Documents: 187 million pages @ \$.264/page = \$49.4 million

Lab Conservation

Treasures: 216,000 pages @ \$30.00/page = \$6.5 million
 Other Intrinsic: 13.0 million pages @ \$ 3.90/page = \$51 million

Non-textual records preservation quantities and cost are as follows:

Copying 25 million existing non-textual units @ \$.84/unit = \$21 million
 Copying 41.6 million accessioned non-textual units @ \$.84/unit =
 \$34.9 million

Estimated Total 22 year Cost of Preservation Plan in 1984 dollars is \$209.1 million.

NOTE: All costs are estimated in 1984 dollars.

The overall preservation plan is divided into nine action categories:

1. Environmental Control
2. Holdings Maintenance of Current Holdings
3. Holdings Maintenance as Part of the Accessioning Process
4. Interception, Assessment, and Protection at Time of Use
5. Systematic Duplication of Thermofax, Mimeograph and Verifax Copies
6. Reproduction of Frequently Used Documents
7. Laboratory Conservation of Intrinsically Valuable Documents that are Damaged or have Potential for Damage and are actively used
8. Laboratory Conservation of Treasures
9. Preservation of Non-Textual Records

The plan was designed originally as a twenty-year-plan to get the job done in a reasonable time period, ideally within the duty tenure of some management personnel responsible for preservation. It is also crucially important to preclude the development of a preservation backlog in the future by performing comprehensive holdings maintenance as part of the accessioning program. Implementation considerations made it advantageous to extend the plan to twenty-two years in order to taper resources and personnel at a rate not exceeding NARS capabilities to train people and efficiently increase the preservation function. Future shifts in usage patterns could result in the need to microcopy other groups of records for preservation purposes. The intercept, assess, protect category (Action Category 4) is designed to detect such shifts in real time (not after-the-fact) so NARS can react to these changes in a timely manner and avoid development of other preservation backlogs.

NARS TWENTY YEAR PRESERVATION PLAN

INTRODUCTION

Permanently valuable archival records in the National Archives and Records Service (NARS) consist of 3.24 billion pieces of paper occupying 1.35 million cubic feet of space and approximately 25.3 million non-textual items, such as motion pictures, sound recordings, still pictures, maps and engineering drawings. Non-textual materials have received priority preservation attention in the past, and since the size of this task has been manageable, most non-textual items are now well preserved.

During the past four years, attention has shifted to the textual paper records. At first, the size of this workload appeared to be overwhelming. An earlier study by NARS in 1978 entitled "Preservation of Historical Materials in the National Archives and Records Service," concluded that, "using current techniques, the cost of performing the minimum preservation requirement of deacidification for NARS textual holdings would cost approximately \$750,000,000.; microfilming--not feasible for all records--would cost nearly \$400,000,000.," for a grand total of \$1,150,000,000.; but added that "a comprehensive survey of NARS archives holdings should be conducted to determine the quantity of records in any given problem category (or set of categories) so that the magnitude and priorities of the program can be more firmly established." Because the Archives is responsible for maintaining records permanently, the 1978 study estimated the cost of taking positive action on all 3 billion pages without regard to any time schedule for completing the work. More realistically, however, the study concluded that the aforementioned comprehensive survey should be structured to establish preservation priorities over a definite period of time.

In the past, preservation was, by and large, performed on an ad hoc basis as needed. With the exception of some microfilming projects and various forms of holdings maintenance (eg. transfer of State Department records into Bauer Boxes or unfolding, reboxing, and reshelving of Pension Files,) very little preservation was performed in a systematic manner, either in response to priorities of established need or to achieve economies of scale.

It is important to keep in mind that the National Archives was only created in 1934; some of the documents had resided in other Government agencies under a variety of storage conditions for over 150 years before being sent to NARS. The type and frequency of preservation treatments is unknown for all these documents prior to accessioning into NARS. It is apparent that much was done using improper materials and procedures. Today, most of this previous treatment must be undone and/or redone. This is not cause to fault the performers of the early preservation work--conservation of paper textual materials is a young art: knowledge, techniques and materials have improved markedly in recent years.

In 1981 at NARS' request, The Statistical Engineering Division, Center for Applied Mathematics, the National Bureau of Standards (NBS) designed a statistically valid survey plan for sampling the population of archival textual paper records to observe and record such characteristics as paper quality, format, current storage needs, intrinsic value, frequency of use, and potential for damage, and to estimate the extent and urgency of needed preservation services. In 1982, NARS requested the Operations Research Division, Center for Applied Mathematics to develop a conceptual model of preservation alternatives based upon type of document, current condition and expected use. The model was coordinated with survey categories to achieve compatibility and to provide a basis for establishing a preservation strategy and long term plan for preservation at NARS.

The statisticians from NBS designed a scientific sample survey of the textual (paper) holdings in the National Archives Building, Washington, D.C., and in archives branches in the Washington National Records Center, Suitland, Maryland. The survey provided estimates of percentages of total holdings in categories (defined by document condition, usage, and value) in the conceptual model developed by NBS operations research analysts. Each of the model categories prescribes both an action and a priority for preservation.

Development of a Preservation Plan

The initiative to develop a systematic preservation plan was begun in autumn of 1982. A basic source of data was the pilot survey (and subsequently the full survey) of the National Archives holdings. Supporting input data was obtained from earlier study reports, interviews with staff and observation of operations within both the reference and preservation functions. Early on it became apparent that the massiveness of the preservation task was to be a constraint on available options while the primary goals must be achieved: PRESERVE THE DOCUMENTARY HERITAGE OF THE UNITED STATES; PROVIDE TIMELY SERVICE TO BOTH GOVERNMENT AND SCHOLARLY RESEARCHERS; HUSBAND SCARCE RESOURCES

These goals and constraints lead to the following strategy for developing a preservation plan:

- o Allocate preservation resources according to need and use
- o Slow down natural aging of documents in storage by improving storage environment and administering holdings maintenance
- o Recopy rapidly deteriorating stencil Mimeograph, Thermofax and Verifax media as soon as practical
- o Reduce routine preservation laboratory work as much as possible to make room for servicing national treasures
- o Prevent accumulation of any future holdings maintenance backlog by performing comprehensive holdings maintenance at time of accessioning

Documents subjected to very infrequent use, which is the usual case for archival records, deteriorate extremely slowly when properly housed and stored in a controlled environment. The proposed plan achieves these conditions through proposed improvements in air temperature and humidity controls and a filtering system to remove deleterious gases. The proposed systematic holdings maintenance will provide suitable housing for the documents.

Documents subject to damage-in-use will be identified and protected prior to use by the proposed intercept program. This program is also designed to collect data on across-branch basis for establishing holdings maintenance priorities and identifying changing usage patterns. This latter collection of enhanced reference service data is a must to provide necessary information for effective management. Proper use of data collected during interception could reduce the need for a resurvey of holdings to once every ten to fifteen years.

Documents classified as national treasures will continue to get priority laboratory conservation as they now do under the plan implemented in 1981.

Categories of documents that are deteriorating, such as stencil Mimeograph, Thermofax and Verifax records (circa 1940-1960), will be systematically recopied as soon as practical where they can be identified to exist in large contiguous groups. Where these documents are found randomly scattered among other documents, they are to be recopied individually in the holdings maintenance programs or the intercept program. The plan calls for performing thorough holdings maintenance at the time of accessioning documents thus precluding the accumulation of future preservation backlogs.

MAJOR FINDINGS

The statistical survey* indicated that 84.5% ($\pm 4.5\%$) or 1.14 million cubic feet (± 0.06 million c.f.) of holdings are inadequately housed and need to be rehoused in acid free file folders and boxes; many bound volumes need protective covers.

Although the survey estimated that 4.9% \pm 1.2% or 160 million sheets of paper have major damage, only 0.8% ($\pm 0.4\%$) or 26 million sheets of the total holdings fall into the category of having intrinsic value, major damage and frequent use; however, it is estimated that during the next twenty-two years, only 13 million of those sheets will be called up for use and require intensive laboratory treatment. This is an estimate based upon discussions with archivists familiar with the various record series; no quantitative data is currently available. The intercept program, when fully implemented will provide quantitative data which will allow for making a better estimate of the number of records requiring laboratory treatment. It is clear that the magnitude of this estimate significantly affects the required preservation resources. Prudence suggests that the greater amount be used for planning purposes until objective estimates become available from the intercept program results. These results will be available long before funds must be committed to increase conservation laboratory capacity above what is certain to be required. Nevertheless, this workload together with the 216,000 sheets of

*The statistical survey of NARS paper textual records was conducted during 1983-84. The survey results are detailed in Appendix A of this report.

National Treasures, will require NARS to more than triple its current laboratory capacity.

An estimated 3% (+1.2%) or 97 million sheets are frequently used papers that should be copied to prevent wear and tear and to facilitate distribution of information to researchers.

An estimated 8.3% (+1.6%) or 270 million sheets of paper consist of rapidly deteriorating reproductions produced by Thermofax, Mimeograph and Verifax processes (The Mimeograph copies contain the documentary history of World War II, the Korean War and the Cold War). About 1.6% (+1.0%) or 52 million sheets of NARS' paper holdings consist of large quantities of Thermofax/Mimeograph/Verifax records that are easy to locate. These endangered papers must be recopied promptly. Other Thermofax/Mimeograph/Verifax papers are widely interspersed with other kinds of papers and will have to be copied when they are located. They have an advantage over whole boxes of Thermofax/Mimeograph/Verifax paper because the interspersed sheets are adjacent to papers that are degrading at a much slower rate. If care is taken to provide and maintain storage conditions described subsequently, these papers should survive until they are located.

The 97 million frequently used sheets and 52 million Thermofax/Mimeograph/Verifax sheets create a combined 149 million sheet copying workload, or 4.6% of the total holdings.

In summary the survey results show that of the current textual (paper) archival holdings:

84.5% (+4.5%) (1.14 million cu. ft.) require holdings maintenance--important because this will be NARS' major effort over the next several years to slow down deterioration as much as possible.

0.4% (13 million pages) require intensive laboratory treatment, such as deacidification, mending, and/or encapsulation. (This includes 216,000 sheets of National Treasures which will receive the most intense treatment.)

4.6% (149 million pages) need to be copied.

(Other statistics describing the characteristics of the textual holdings are shown in Appendix A, "Statistical Survey of NARS Paper Textual Records.")

COST ESTIMATES

Constant (1984) dollars are used throughout this report. Total costs are estimated for the 22 year period of the plan. Unit costs are based on recent data and expectations of economies of scale in activities such as holdings maintenance and microcopying.

Recent holdings maintenance cost data is derived from sporadic and small scale activities. These unit costs are high and not based upon carefully planned and systematic production. In the future, holdings maintenance will be performed routinely and systematically on new accessions, and within entire stack areas and significant economies-of-scale are expected to accrue. Copy costs do not decline because the main cost associated with copying is the labor to get the sheet in front of the camera; furthermore, it is estimated that much difficult copy work that has been previously avoided will have to be done. This work will require some mending or flattening before copying.

It is important to note that dollars alone will not get the preservation job done: positions are also required. Proper document preservation requires carefully developed skills, close supervision and significant amounts of professional archival judgment. This can only be accomplished by training, developing, and supervising archives personnel on an in-house basis.

Appendix B, entitled "Budget Charts," displays a breakdown of costs and full time equivalents (FTE's).

Holdings maintenance cost estimate

Holdings maintenance is estimated to cost on the average \$24.40 per cubic foot, which includes three archives boxes, an average of 36 file folders, relabeling, and reshelfing or shrink-packaging of bound volumes where required. The shrink-packaging costs only \$0.50 per volume, while holdings maintenance of loose papers with reshelfing costs about \$9.00 per archives box.

In addition to 1.14 million cu. ft. of holdings maintenance for the current holdings, an additional 748,000 cu. ft. of new accessions will arrive at the National Archives during the next twenty-two years. Therefore, the total cost estimate over 22 years is:

$$(1.9 \text{ million cu. ft.}) \times (\$24.40 \text{ per cu. ft.}) = \$46 \text{ million.}$$

Copying cost estimate

The average copying cost is \$0.264 per page, which includes preparation, camera work, processing, and verification.

In addition to the 149 million pages in the current backlog in need of copying, there will be an estimated 38 million pages accessioned into the Archives during the next twenty-two years that will need to be copied.

Therefore the total cost estimate over 22 years is :

$$(187 \text{ million pages}) \times (\$0.264 \text{ per page}) = \$49 \text{ million.}$$

Intensive laboratory preservation cost estimate

Average estimated cost of \$30.00 per page for treasures. The total cost estimate over 22 years is:

(216,000 pages of treasures) × (\$30.00 per page) = \$6.5 million.

Average estimated cost equals \$ 3.90 per page for other intrinsically valuable documents. The total cost estimate over 22 years is:

(13 million pages) × (\$3.90 per page) = \$51 million.

COMPREHENSIVE PRESERVATION PLAN

The overall preservation plan is divided into nine action categories:

1. Environmental control
2. Holdings maintenance of current holdings
3. Holdings maintenance as part of the accessioning process
4. Interception, assessment, and protection
5. Systematic duplication of Thermofax, Mimeograph and Verifax copies
6. Reproduction of frequently used documents
7. Laboratory conservation of intrinsically valuable documents that are damaged or have potential for damage and are actively used
8. Laboratory conservation of National Treasures
9. Preservation of non-textual records

ACTION CATEGORY 1: Environmental Control

Environmental control of the atmosphere in the stacks will provide desirable temperature and relative humidity and will remove dust and deleterious gases which contribute to the aging and deterioration of paper documents. (Funding for capital costs is not carried under the NARS preservation budget. However, environmental control is such an integral and necessary component of the preservation plan that it must be referenced in a description of the plan.)

In 1982 NARS engaged the Public Building Service (PBS) to conduct a study of the environmental conditions in the stacks at the National Archives Building. PBS subcontracted the work to the NBS Center for Building Technology. The study, published in November 1983, specifies air quality criteria for storage of paper-based archival records. NARS continues to engage PBS for obtaining an architectural/engineering firm to redesign the heating, ventilation, and air-conditioning (HVAC) systems in the National Archives building. The goal is to provide constant cool, dry, and clean air in the stacks.

ACTION CATEGORY 2: Holdings Maintenance of Current Holdings

"Holdings maintenance" is a term used to describe storage enhancement of archival material that slows down the rate of deterioration. In the library world this is called "collections maintenance." In some other countries it is termed "preventive conservation." Good storage techniques include the use of acid-free boxes and file folders; and flat, unfolded and neat, vertical filing of paper records. (Sometimes, it is necessary to relax folded papers by slight, temporary humidification.) When these activities are performed in the stacks and do not include item-by-item laboratory-type treatment, they are considered to be "holdings maintenance."

Accelerated and systematic holdings maintenance (akin to preventive maintenance), will preclude substantially more time-consuming and costly preservation in the future. As an example, many documents are housed in acidic boxes and acidic file folders. This condition is deleterious on a long term basis. The damage caused to documents adjacent to acid-bearing materials is readily apparent. Furthermore, many of the documents are folded, resulting in stress and embrittlement of the paper. Where these conditions are evident, the documents should be unfolded, refoldered, and reboxed.

The occasional Mimeograph, Thermofax or Verifax copy located during this holdings maintenance process should be recopied in situ. Documents subject to damage-in-use should either be copied in situ or placed in a protective polyester envelop. Where the incidence of Mimeograph, Thermofax or Verifax copies or documents subject to damage-in-use is more than occasional, it cannot be serviced in holdings maintenance. In these cases it will be necessary to determine the extent of documents needing such service and set up a separate service project.

Relabeling folders and relabeling boxes is a necessary step in holdings maintenance. If self-adhering labels are prepared using a keyboard and micro-computer, the data typed for the box labels could be used to provide shelf lists and finding aids as a concomitant output at little additional cost (folder lists also could be provided).

Bound volumes that are too weak or too damaged to stand intact as a unit on the shelf will be shrink-packaged (shrink-packaging is an inexpensive process that uses an inert, thin polyolefin film that will shrink tightly around a volume when slightly heated).

Maintenance teams should be systematically scheduled through the various custodial units to perform this preventive maintenance on current holdings in priority order as determined in the interception, assessment and protection process.

During the next twenty-two years, holdings maintenance will be performed on the backlog of current holdings. This amounts to a workload of 1.14 million cu. ft., for which the estimated cost totals \$ 27.8 million.

ACTION CATEGORY 3: Holdings Maintenance as Part of the Accessioning Process

Holdings maintenance protection will also be applied systematically to all new accessions. The significance and necessity of performing holdings maintenance as an integral part of the accessioning process cannot be overstressed: ONLY BY ASSURING THAT INCOMING DOCUMENTS ARE PROPERLY HOUSED CAN NARS KEEP THE MAINTENANCE BACKLOG FROM INCREASING.

There will be very few intrinsically valuable records worthy of intensive laboratory treatment among the most modern records. Furthermore, within the timeframe of this plan, about twenty-two years, the most modern records are not likely to be subjected to wear and tear or the stresses of inadequate storage to cause enough damage requiring intensive laboratory treatment. Some documents must be copied and others put into acid-free folders, but they will

rarely, if ever, require intensive laboratory treatment. Furthermore, performing holdings maintenance at time of accessioning will create storage conditions that will help preclude future damage or deterioration.

The occasional Mimeograph, Thermofax or Verifax copy located during this holdings maintenance process should be recopied in situ. Documents subject to damage-in-use should either be copied in situ or placed in a protective polyester envelop. Where the incidence of Mimeograph, Thermofax or Verifax copies or documents subject to damage-in-use is more than occasional, it cannot be serviced in holdings maintenance. In these cases it will be necessary to determine the extent of documents needing such service and set up a separate service project.

During the next twenty-two years, 748. thousand cubic feet of new paper records will be processed into the Archives. Preservation actions taken at time of accessioning will cost an estimated \$ 18.6 million for the twenty-two-year period.

ACTION CATEGORY 4: Interception, Assessment, and Protection

This action category specifies systematic interception, assessment and protection (if needed) of all documents as they are referenced by the staff or researchers. This process includes evaluation of condition and may include protection of the document by copying, covering, etc., if these documents have a potential for damage-in-use. This action category includes recopying the occasional stencil Mimeograph, Thermofax, Verifax copy that will be found during assessment.

Where the incidence of Mimeograph, Thermofax, or Verifax copies or documents subject to damage-in-use is more than occasional, it cannot be serviced under Action Category 4. In these cases it will be necessary to determine the extent of documents needing such service and set up a special service project.

Interception and assessment identifies documents that are used. These documents should receive a higher priority for preservation than documents which are not being used.

The procedure also:

1. Assures that documents delivered to researchers are tidy and properly aligned. If documents are delivered to researchers in good order, they are likely to return them in good order. Use of documents in good order is easy to oversee and they can be readily inspected upon return. Documents delivered in good order are self-policing.

2. Assures that document boxes are clean, dust-free, and reasonably free of damage. This is important in maintaining the proper image of NARS to researchers and is supportive of the self-policing aspect of tidy documents in good order.

3. Protects the occasional sheet from being damaged-in-use by placing it temporarily in a polyester envelope or by making an electrostatic copy for the user. When there are many documents subject to damage-in-use, the researcher is to be personally cautioned about the care and handling of the documents or, under rare circumstances, the documents are to be withheld until they can be protected or copied.
4. Provides consistent information to the holdings branches, subject to stack verification, on the need for systematic preservation within the branch.
5. Provides quantitative data for establishing priorities for scheduling holdings maintenance among branches.
6. Reduces the frequency of need for periodic surveys of NARS holdings and provides an accurate, on-going record of the conditions of documents-being-used.

Available evidence suggests that paper documents, stored under proper conditions in a "good" environment, last indefinitely. Of course, mechanical (and chemical) interactions from heavy use cause wear, which must be prevented and/or repaired, or the document must be copied. Usage of archival documents is rarely heavy enough to cause this type of mechanical/chemical damage. In those series of records where use-damage threatens the life of the documents, the plan provides for conserving and/or copying these documents for preservation. The document-intercept program was explicitly conceived to limit and to quantify these types of problems.

In extreme cases, interception and assessment could result in temporary withholding of the document(s) if laboratory treatment is the only way they can be adequately protected. This would occur only with documents that cannot easily be copied or otherwise protected. Ideally, such documents should be withheld until proper laboratory conservation treatment or other protective treatment can be performed; in all practicality, however, the need for such treatment will be noted and performed subsequently on a priority scheduled basis.

Information will be collected during the interception and assessment process: data that will identify specific sets of records that are frequently accessed and are in need of holdings maintenance, systematic reproduction and/or laboratory treatment. These data collected at time of use will provide NARS with a validation check of the conceptual model.

A pilot project to refine the concept of interception, assessment and protection started in the fourth quarter of FY 1984 in the Navy and Old Army Branch of the National Archives. The purposes of the pilot project are: (1) to determine how much protection can be provided at the time of use without disrupting reference and projects, (2) to improve housekeeping, and (3) to develop a procedure for collecting data that will establish preservation priorities and records usage patterns.

ACTION CATEGORY 5: Systematic Duplication of Mimeograph, Thermofax, and Verifax Documents

Immediate action is required to prevent the loss of important information on stencil-Mimeograph, Thermofax and Verifax reproductions produced during the 1940's and 1950's. The paper stock and ink definition of these especially fragile documents are rapidly deteriorating, with accompanying loss of legibility. The contrast between the printed images and the paper is diminishing. If too much time elapses before photocopying or microcopying, information will either be lost or be reclaimable only at exorbitantly high costs.

These most endangered paper records must be recopied promptly. The primary endangered groups of records are:

1. Those created on very poor quality sulphite paper during World War II and the Korean War era, exemplified by stencil-mimeographed reproductions, with a total life expectancy of about 65 years. The U.S. Bureau of the Budget issued Regulation Number 4 on August 31, 1942, to conserve resources during wartime. This regulation ordered government agencies to use sulphite paper, an inexpensive grade of paper that was inherently unstable because of its high acidity. Ironically, this wartime conservation measure has contributed to the current need for increased preservation resources.

2. Those created during the same time period by "quick-copy" techniques, such as Thermofax and Verifax. The plan calls for an accelerated program to microfilm or photocopy the large batches of these papers, estimated at 52 million pages. Widely dispersed impermanent copies will be recopied as they are located either in interception or holdings maintenance processes.

It is estimated that, within ten years, information in the earliest of these high-risk records will begin to disappear, a process that will expand inexorably without corrective action.

The cost of this 52 million page copying program is estimated to be \$13.7 million over the next twenty-two years.

ACTION CATEGORY 6: Reproduction of Frequently Used Documents

Records that have a high and continuing research value, that are not otherwise available in published form, and that would suffer damage from continuing use will be scheduled for reproduction. The choice of records and the setting of priorities will be made using data collected in the interception, assessment, and protection program described in Action Category 4. Usage patterns are the prime indicator for selecting records for microfilm publications.

It is estimated that it will cost \$25.6 million over the next twenty-two years to copy the 97 million pages in the category of frequently used documents.

Furthermore, some new accessions will be in high demand as soon as they are available to the public; therefore, the plan calls for copying 38 million pages of new accessions during the next twenty-two years at a cost of \$10 million.

ACTION CATEGORY 7: Laboratory Conservation of Intrinsically Valuable Documents that are Damaged or Have a Potential for Damage and are Actively Used

The interception, assessment, and protection activity described in Action Category 4 will yield a listing of intrinsically valuable documents that are in need of laboratory treatment because they are either damaged or have a potential for damage and are frequently used.

"Laboratory Conservation Treatment" is a term used to describe a variety of actions taken on archival materials in a laboratory setting where special equipment and skills are needed. For example, the removal of tape usually requires solvents, and the use of solvents requires a fume hood and familiarity with ink/solvent reactions. Laboratory conservation treatments consist of intensive item-by-item actions such as tape removal, mending, strengthening, cleaning, lamination, deacidification and other chemical processes.

Encapsulation can be either a laboratory function or, if it is performed in the holdings or intercept area and if no laboratory-type treatments are performed, a holdings maintenance function.

Additionally, some unavoidable laboratory conservation work will be performed on badly damaged records in preparation for microcopying, and on some frequently-referenced documents that are difficult to copy.

Treatment of the 13 million sheets of paper in this category will cost \$51 million over the next twenty-two years.

ACTION CATEGORY 8: Laboratory Conservation of National Treasures

The "national treasures" (documents of high national interest such as treaties with foreign countries) deserve priority access to the conservation laboratory. A separate plan and schedule for conserving these documents was developed in 1981 and is on-going. These national treasures comprise about 900 cubic feet of the most historically significant records in the National Archives. Implementation of, and adherence to, this preservation plan will help prevent "non-treasures" from needing conservation laboratory treatment and, therefore, will allow more treasures to be treated in the laboratory.

An estimated 216,000 sheets of treasures need laboratory conservation treatment. This high order laboratory work will cost an estimated \$6.5 million over the next twenty-two years.

ACTION CATEGORY 9: Preservation of Non-textual Records

Of the current non-textual holdings (movies, pictures, sound recordings, machine-readable tapes, etc.), 79% require no treatment. Approximately 21% of the non-textual holdings need to be copied.

The current backlog of 25 million non-textual units to be copied will cost an estimated \$21 million over the next twenty-two years.

The plan calls for the expenditure of \$34.9 million to preserve 41.6 million in-coming non-textual units during the next twenty-two years. There will be a growth in the use of non-textual media during this period, resulting in a substantial increase in the amount of non-textual materials coming into the Archives in the future.

IMPLEMENTATION

The number of full time equivalent (FTE) employees performing preservation activities will gradually increase in the early years of the plan to a level of 198 when NARS reaches full funding for the preservation program. That will be an increase of 148 over the FY 1984 FTE level of 50 for preservation activities. Because NARS cannot absorb the full funding until full staffing is authorized, the budget and staffing increases need to be coordinated. This will extend the work a few years because NARS cannot absorb the full increment in the first year and will take about two years to get up to full staffing. Thus the plan, originally conceived as a 20 year plan actually becomes a 22 year plan to utilize these resources more efficiently. The amount of increase and timing for full staffing also depends upon recruitment and training, again probably phasing in over a two year period. In addition, the mix of work will change over the twenty-two year period of the plan: holdings maintenance will be the main focus of work in the first five to ten years and laboratory conservation will be the main focus of work during the latter ten-or-so years.

CONCLUSION

This preservation plan covers a long period--22 years. It is costly in money and other resources; however, the plan establishes a preservation program to finish the job in a finite amount of time. One should note that the reason there is so much maintenance (preservation) to be performed and resulting costs are high is that this work was not performed when it should have been. The Archives began operations in 1934; some documents had resided in other government agencies in a variety of storage conditions for over 150 years before being sent to the National Archives. The adage, "stitch in time saves nine," also applies to archival preservation. The general term for this accumulation is "deferred preservation" or "deferred maintenance." By deferring preservation in the past, expenses were reduced and taxpayers' burden was reduced accordingly for that time period. NARS is approaching the day where deferring preservation work much more will result in an increasing number of documents being lost forever.

Comparison of estimated costs of the 1978 preservation plan--\$ 1.15 billion (1978 dollars), over an undefined time period--with the present systematic preservation plan--\$209.1 million (1984 dollars) over 22 years--shows that by being selective and choosing a sound strategy, costs are substantially reduced.

Figures 1-4 depict the working-down of the preservation backlog over the 22 year period. Beginning in the 19th year: holdings maintenance will need to be performed only on documents being accessioned; most conservation lab work will address the maintenance of treasures; some lab work will be required to maintain documents of intrinsic value, to make occasional document repairs, and to support copying projects.

Microcopying and other preservation copying projects could decrease less than currently predicted if usage patterns of documents shift and cause different groups to need preservation. It is impossible to predict such shifts at this time. The enhanced reference service data collected during the intercept program will provide early warning of these shifts in usage patterns.

NARS 20 YEAR PRESERVATION PLAN

HOLDINGS MAINTENANCE WORKLOAD REDUCTION

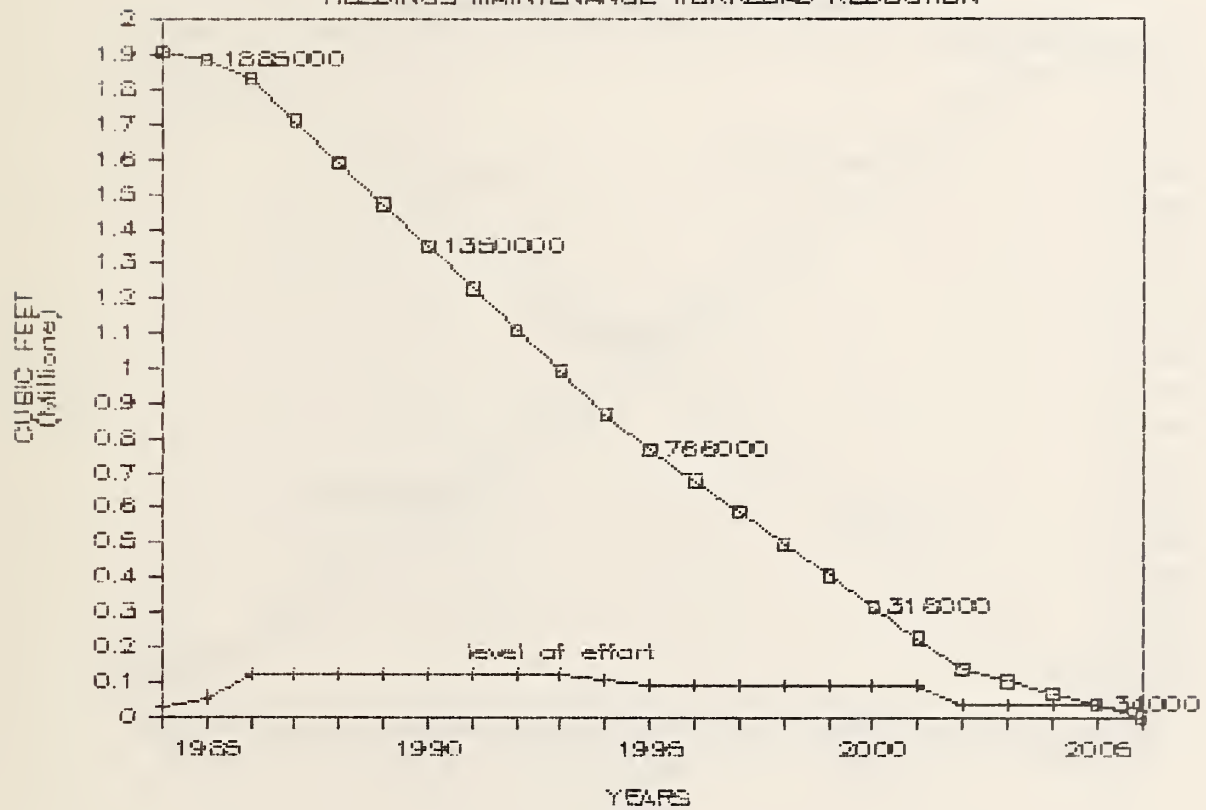


Figure 1
Holdings Maintenance Workload Reduction

NARS 20 YEAR PRESERVATION PLAN

REPRODUCTION WORKLOAD REDUCTION

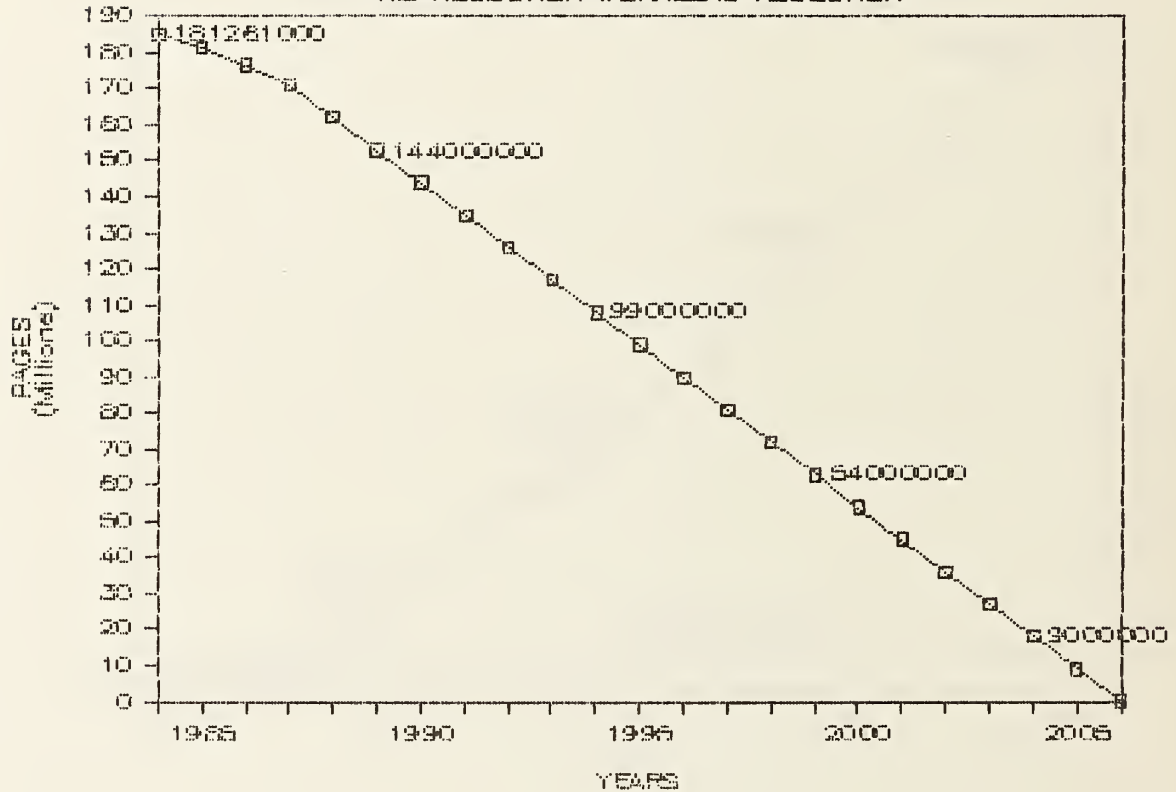


Figure 2

Reproduction Workload Reduction

NARS 20 YEAR PRESERVATION PLAN

LABORATORY WORKLOAD REDUCTION

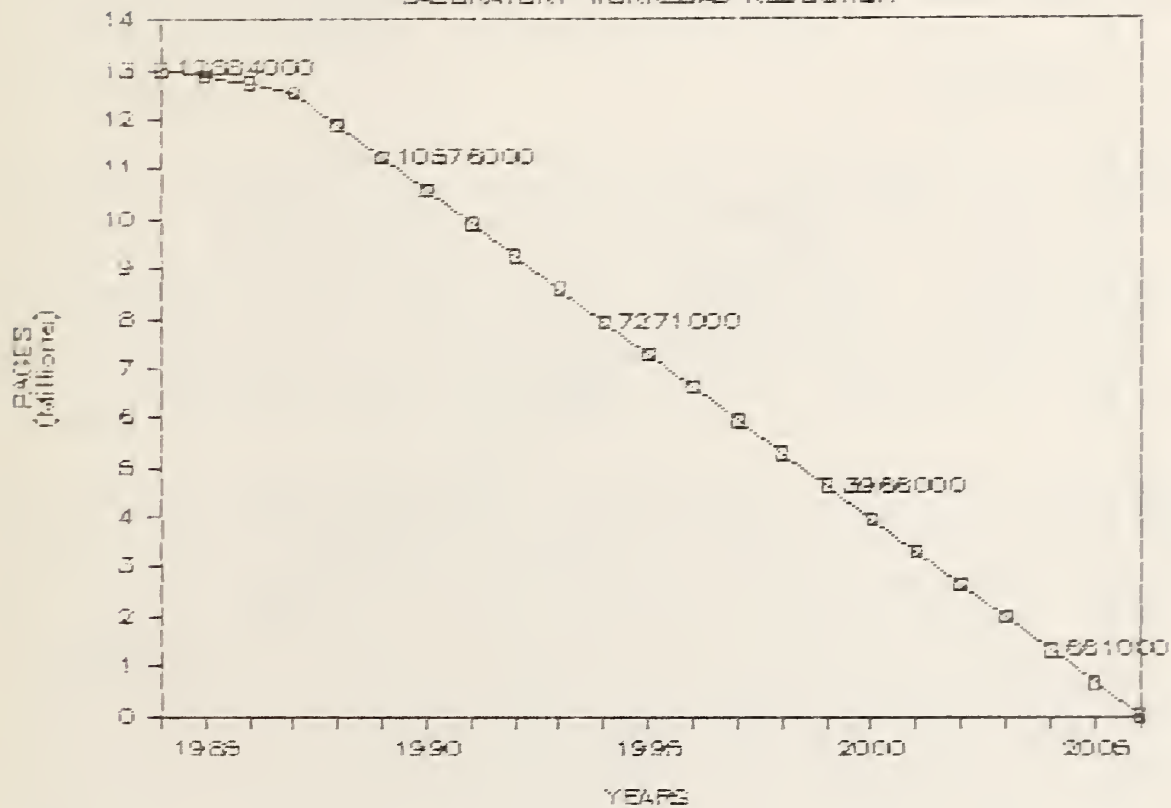


Figure 3
Laboratory Workload Reduction

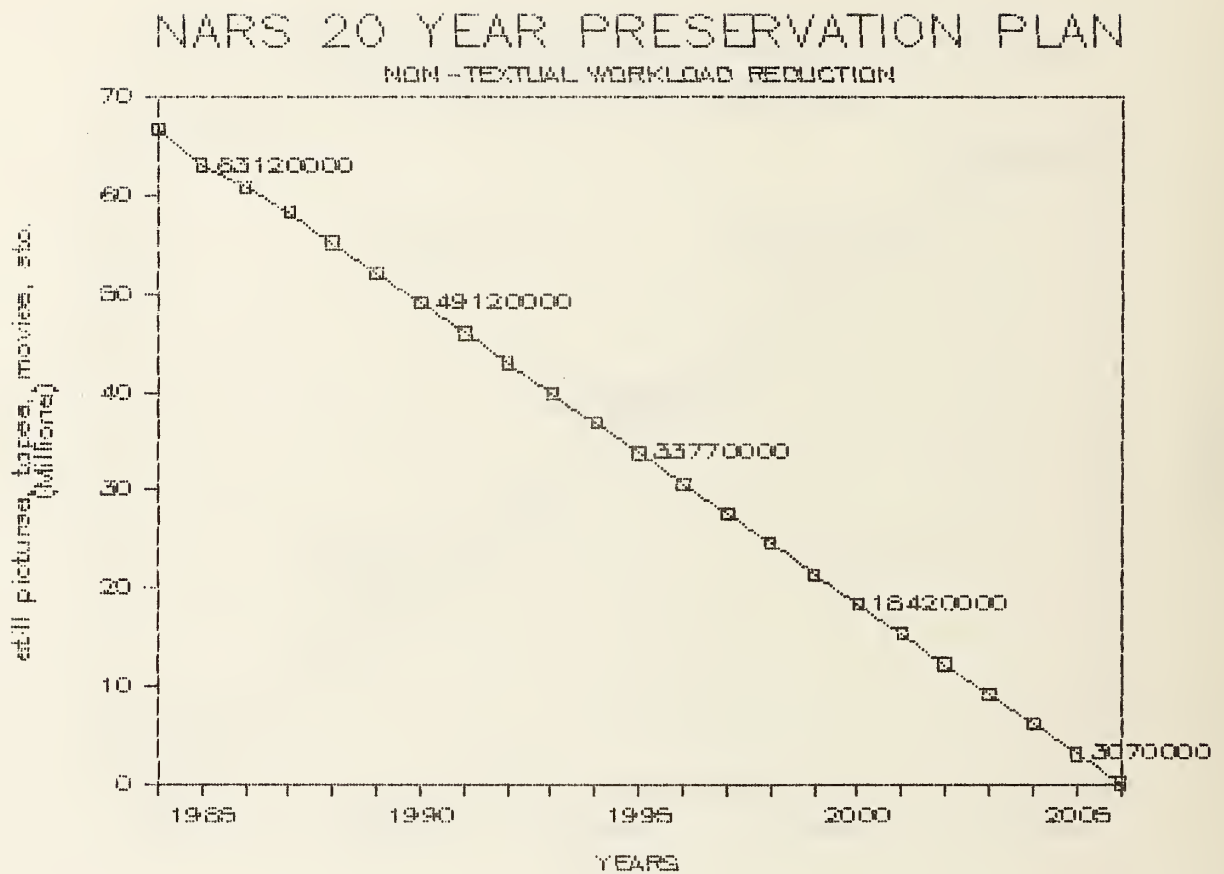


Figure 4

Non-Textual Workload Reduction

Appendix A - Statistical Survey of NARS Paper Textual Records

This large survey was conducted as a stratified systematic sample of holdings of the Office of the National Archives and the civil and military branches at the Washington Regional Archives in Suitland, Maryland. The sampling scheme was based on the procedure of entering each stack area and taking a "1-in-50" systematic sample of compartments. The only stack areas not covered were those that contain material outside the pre-defined survey population. Examples of such non-survey materials include microfilm, photographs, printed archives, sound recordings, and legislative records.

Stratification

The sample selection procedure was carried out by Jimmy Rush, an archivist with broad experience in the physical lay-out of the stack areas. From the information compiled during sample selection, a "Stack Area Report" was prepared for each stack area at the Archives Building in Washington, D.C. and the Washington National Records Center in Suitland, Md. For stack areas that were determined not to be part of the survey population, a reason was given for that determination. For stack areas surveyed, the locations of all sampled compartments were listed and the number of compartments in use, determined by actual count, was listed.

The sample selection process led to identification of samples in 144 stack areas. Two of these were deleted from the survey because they were later found to belong to non-survey categories (legislative and Printed Archives,) so the final number of surveyed stack areas was 142. Stack areas were used as the basis for stratification of the population--the idea being to develop estimates for each stack area (stratum) separately and then combine the results to develop overall statements for the population. However, the final number of strata used in the statistical estimation procedures was reduced from 142 to 127 by combining certain stack areas to form larger strata. This was necessary whenever a stack area contained only one sample unit, because evaluation of statistical uncertainty in the estimates requires at least two sample units per stratum. Thus, stack areas with one sample unit were combined with neighboring stack areas, as necessary, to ensure that the resulting strata all contain at least two sample units.

Sample Selection Procedure

As previously mentioned, sample compartments were chosen within stack areas by a "1-in-50" systematic sampling scheme. Specifically, after choosing a random start, Jimmy Rush counted compartments in use and chose a sample unit from every 50th compartment. From a chosen compartment, a sample unit (i.e. a box or bound volume) was chosen at random, as follows. First a shelf was chosen, at random, from the shelves in use. Then the sample unit was randomly identified from the units on the selected shelf. The random selections were performed using appropriate tables of random numbers.

Since the numbers of boxes or volumes per compartment (and their sizes) vary considerably over the survey population, information was recorded to take these factors into account in subsequent calculation of factors to expand the

samples to the population. Specifically, the number of shelves in use was recorded for each chosen compartment, as well as the number of units (boxes, volumes) on the selected shelf, and the size of the sample unit.

While samples were selected for the survey by Jimmy Rush, the basic evaluation of samples and data recording were done by others, namely, Ann Elam and Eric Bechtel--two experienced preservation technicians. (In addition Alan Calmes evaluated some samples in security areas.) This division of duties required special effort to make sure that the samples initially selected were all accounted-for in the final data.

The number of samples selected by Jimmy Rush was 1134. After several rounds of checking and follow-ups, survey evaluation forms were completed for all 1134 of the selected samples.

Coarse Features of the Population

Based on the count of compartments-in-use in each stack area, the total survey population consists of some 56,639 compartments. The total volume of records in these compartments is estimated to be 1.12 million cubic feet, with an uncertainty (95% confidence interval) of $\pm 2\%$, or ± 0.02 million cubic feet. The textual archives of the United States comprises the textual records determined by the Archivist of the United States to have sufficient historical or other value to warrant their continued preservation. The survey was selected only from holdings of the Office of the National Archives in the National Archives Building and in the civil and military branches of the Washington National Records Center. The total holdings of these surveyed two locations is estimated as 1.12 million cubic feet ± 0.02 million cubic feet. Experienced archivists do not believe that the holdings of the unsurveyed regional archives are different from the holdings which were surveyed. The volume of holdings in the unsurveyed regional archives is estimated to be 0.23 million cubic feet. The percentages of holdings in various preservation categories were therefore applied to the estimate of total textual holdings, $1.12 + 0.23 = 1.35$ million cubic feet, to provide estimates of total textual preservation workload quantities. (The holdings of Presidential libraries are not included in this preservation plan.)

It should be noted that all estimates of cubic feet are based on a scale that treats loose papers and bound volumes ("books", for short) somewhat differently. The main use of estimates of cubic feet is to convert them to estimates of numbers of sheets of paper, by the rule that a cubic foot contains about 2400 sheets. This figure, while reasonable for boxes of loose papers, is too small for books. Since pages in books are so tightly packed, a better figure is about 3600 sheets per cubic foot (assuming letter or legal sized paper.) This is based on measurements of some books around the office and on a small amount of survey data for the physical volume taken up when books are stored in standard "1/3-cubic foot" boxes.

Thus, somewhat arbitrarily, the effective volume of each book selected for the survey was calculated from the actual physical volume (obtained by using a tape measure at the time of surveying) by multiplying by 1.5 ($= 3600 \div 2400$).

While this convention overstates the physical volume taken up by books (at least when they are shelved efficiently,) it was felt that the resulting figures will be more realistic for estimating preservation workloads that are tied to the number of sheets of paper.

Examination of the returned survey forms showed that not all of them yielded information about the intended survey population. Exceptional cases were grouped into 3 broad categories as described below.

Nonsurvey material:

This category consists of material that logically does not belong to the intended survey population, but that was mixed-in among materials intended for the survey. Some of this occurred as an inevitable outcome of the sampling procedure since archived materials were only skipped when they consisted of large contiguous blocks of material that were clearly outside of the defined population (for example when an entire stack area consists of microfilm.)

Sample units that were found to consist of "nonsurvey" material included legislative records, sound recordings, microfilm, "courtesy storage" for various non-archives organizations, printed archives, cartographic records, non-accessioned records, records already marked for disposal, and "empty shelves" that were found when the surveyors went to the designated locations. These "empty shelves" were in use when selected by Jimmy Rush, but were vacated between the time of sample selection and survey data collection. These records may have been disposed or simply moved to new locations during this time. Only one such instance occurred, corresponding to less than 1/10 of 1% of the population.

The total amount of non-survey items in the population was estimated to be 41,000 cubic feet, or about 3.7% of the total volume of 1.12 million cubic feet. The uncertainty in these figures (95% confidence intervals) is about $\pm 14,000$ cubic feet, or $\pm 1.2\%$ of the total population.

Unused portion of storage units:

Many of the storage boxes are not completely full. Some books contain substantial numbers of blank pages. The extent of this condition was recorded for each sample unit in question number 19 (see Exhibit 1.) The total unused portion of the survey population was estimated to be 46,500 ($\pm 10,000$) cubic feet, which amounts to 4.1% of the total 1.12 million cubic feet.

Disposable material:

Question 1 on the survey form asked whether the sample unit belonged to a series that is considered to be disposable, as judged by an archivist familiar with the series. The total volume of disposable material is estimated to be 26,000 cubic feet ($\pm 10,000$) or 2.3% ($\pm 0.9\%$) of the total survey population.

After subtracting the nonsurvey units, and unused portion, and disposable materials from the total population, 1.01 million cubic feet, or 89.9% of the total, remain representing the originally defined conceptual population of interest. Thus about 10% of the material that might appear at first glance to belong to the population of interest does not in fact belong to that population.

These coarse features of the population actually surveyed are summarized in Exhibit 1.

Summary of Individual Items on the Survey Form

The actual collection of data for individual sample units was accomplished by NARS personnel who completed a "checklist" for each unit. The checklist form is shown in Exhibit 2. Part I of the form, questions 1-6, was completed by an archivist familiar with the particular series being surveyed. Part II was completed by preservation technicians.

Detailed instructions were prepared to interpret individual questions on the form. These instructions were revised during and after the survey to reflect what was learned by experience and to document an accurate and consistent interpretation of the survey questions. They are reproduced as Appendix C of this report.

A complete numerical summary of the survey data is presented in Exhibit 3. In this exhibit, and elsewhere where appropriate, the question numbers on the "checklist" form are denoted for example as Q3 (referring to question number 3), etc. The responses to each question are reported as percents relative to the total volume of material in the population surveyed (i.e. 1.12 million cubic feet--see Exhibit 1.)

The use of the class groupings labeled "(Few), (1/4), (1/2)", etc., to represent the actual fraction of the contents of a sample unit in a given condition category was convenient for collecting data, but is cumbersome for summarizing it. There is no unique way to combine the information across the 5 classes from "Few" to "All" to form a composite estimate of the percentage of the population in a given category. Therefore a simple expedient solution has been taken and reported in Exhibit 3 under the heading "Weighted Avg." This weighted average is computed by assigning all the data in each class to the midpoint of the corresponding interval. Thus, the numerical fractions of sample units corresponding to the classes: (Few), (1/4), (1/2), (3/4), and (All) were 0.025, 0.15, 0.50, 0.85, and 0.975, respectively. By this device, the classes could be combined into the weighted averages reported, which represent a more compact summary of the data.

"Other" categories:

Several of the questions have responses marked "Other (Specify_____)." A summary of the data obtained in the "specify" portion of these questions follows. Numbers given are raw counts of numbers of sample units containing the specified types of documents.

Q12f (Other Types of Support):

6 drafting cloth	1 tracing paper	1 wax
3 photos	1 linen tracing paper	1 coated photo print
3 carbon	1 linen cloth	1 Ozalid
2 photostat	1 thin drawing paper	1 carbon backed paper
2 coated	1 wax paper	1 carbon backed book

Q13i (Other Types of Media)

107 photostats	1 ledger sheets
75 blue prints	1 white print
5 Ozalid	1 telegram
2 stamps	1 seal
1 dictabelts	1 carbon paper
1 glossy magazine- type covers	1 dental x-rays
1 electrocardiograph	

Q15d (Other Previous Treatment)

62 cloth backed
2 paper backed
2 rebound

Q16g (Other Major Damage)

3 insect	1 paper crumbled
1 ink spill	1 fire
1 curled	1 warped

Uncertainties:

Because the presentation of the estimates in Exhibit 3 is complicated, individual statements of uncertainties have been omitted, even though they have been calculated. Instead, the table in Exhibit 4 provides rough guidelines for approximating the relevant uncertainties. These guidelines amount to a summary of the actual uncertainties, which were calculated individually as part of the statistical analysis.

NARS Long Range Preservation Conceptual Model

The conceptual model of the long range preservation program has been revised a number of times in order to improve the fit of preservation options to needs. This model has always been logically oriented toward individual sheets of paper. Even though the survey data do not directly give information on individual sheets, it is of interest to try to adapt the conceptual model logic to the survey data.

Exhibit 5 is a flow chart representing the most current conceptual model (circa September, 1983), modified to be compatible with to the survey data. In Exhibit 5, all of the decision points, represented by diamond-shaped boxes, are defined to apply to a whole unit (i.e., an archives box or bound volume) of records. The terminal boxes on the flowchart are then broken down into

several categories to represent the mixture of categories (for individual sheets of paper) that might be found in a given unit. The estimated percentage of the total surveyed population (on a base of 1.12 million cubic feet--see Exhibit 1) is given in each terminal box. The uncertainties in the estimated percentages can be inferred from the guidelines in Exhibit 4.

The decision points (diamond-shaped boxes) in the flowchart are defined as follows:

• Disposed; Nonsurvey material; Empty portion

yes: Combination of the first two categories described in Exhibit 1 and corresponding text. "Empty" portion means "unused" portion.

no: All other material.

• Disposable

yes: Q1 = Yes

no: Q1 = No or missing

• Bad Housing

yes: Q9b = Yes, or Q9c = Poor, or Q9d2 = Yes, or Q9e = Acid, or Q14d > 0, or Q10d > 0, or Q10e > 0, or Q10f > 0, or Q10h > 0

no: all else

• All Impermanent Copies

yes: Q13e = (All)

no: all else

• Is There a Copy

yes: Q5 = yes or Q6 = yes

no: all else

• Any Damage or Potential Damage

yes: any of Q13j, Q16 a-g, Q17, Q11e, Q12a, Q14e greater than 0

no: all else

• Frequently Used

yes: Q3 = at least once a month

no: all else

- Intrinsic Value

yes: $Q2 = 1$

no: all else

- Homogeneous File

yes: $Q2b \neq \text{yes}$ and $Q11e = 0$ and $Q14f \neq \text{No}$

no: all else

The remainder of this section gives a brief description of the conventions used to obtain the summaries in the terminal boxes numbered 6, 7, 10, 11, and 13 on the flowchart.

The categories abbreviated Imp., DSM, Loss, OvSz, News., and Brtl, are just summaries of the relevant single questions from the checklist form. They were estimated using the weighted average method described for Exhibit 3.

The category MDmg., for Major Damage, is an attempt to summarize by a single number the information in seven sub-questions, namely, parts a-g of Q16. Strictly speaking, it is impossible to know from the survey data the exact relation among the various categories of major damage listed under Q16. For example, if "(1/4)" of the sheets have tape damage (Q16d) and "(1/4)" have acidic ink, we can't tell whether the same sheets have both types of damage (at one extreme) or whether each damaged sheet has one, and only one type of damage (at the other extreme.) If each damaged sheet has both types of damage, then (in this example) a total of "(1/4)" of the sheets would have major damage. On the other hand, if every damaged sheet has one and only one type of damage (either tape damage or acidic ink, but not both), then $1/2 (= 1/4 + 1/4)$ of the sheets would have major damage. All we really know is that the fraction of sheets with some major damage is between these extremes.

A simple mathematical assumption allows calculation of a value for the combined fraction of damaged sheets that will always lie between the two extremes described above. The assumption is that the various types of damage are independent. That is, sheets damaged by one cause are, for that reason, neither more nor less likely to be damaged by another cause. This assumption seems to be the most reasonable way to combine parts a-g of Q16 into a single number, under the circumstances. Fortunately, for most sample units, only one or two types of major damage were found--in which case, the inaccuracy of this approximation is minimized.

The procedure used to come up with the estimates for "Other" was somewhat more arbitrary. This category is supposed to include all sheets of paper that are not impermanent and do not have major damage or potential for damage (see footnote to Exhibit 5.) The trouble is many sheets with potential for damage are also already damaged (e.g. brittle paper that already has some loss of information.) After some deliberation and looking through the sample data, the best (conservative) procedure found to define the "other" category was the following formula:

$$P_{\text{other}} = 1 - \max(P_{13j}, P_{16}, P_{17}) - P_{11e} - \max(P_{12a}, P_{14c}) - P_{13e}$$

where the symbol "P" represents estimated proportion and the subscript indicates the relevant survey question or category. Evidence from the data is that the above formula for P_{other} will tend to underestimate the actual fraction of sheets that are not in the damaged and potentially damaged and impermanent categories. In fact, this formula leads to a negative value for P_{other} fairly often with the survey data, so that in practice the estimate obtained by the formula was replaced by zero for the substantial number of units (more than 60) where the formula gave a negative result.

As a result, the practical interpretation of the percentages reported as "other" in the flowchart would be that they represent conservative underestimates of the portion of the survey population that does not belong to any of the damaged, potentially damaged, or impermanent categories.

Summary of Survey Findings Classified into Conceptual Model Categories

Subject to the aforementioned qualifications, the percentages of holdings in categories defined by the flow chart in Exhibit 5 are summarized below. The numbers at the left side correspond to the numbering of terminal boxes on the flow chart. In the summary, a "unit" refers to a unit of study, namely, a storage box or bound volume. Note that the listed percentages are estimates for the survey population, and that they add to more than 100 due to overlap among some categories.

0. Disposed and non-survey material, plus empty or unused portion of units	7.8%
1. Disposable records	2.3%
2. Units in need of holdings maintenance	84.5%
This item corresponds to 2.55 million archives boxes (approximately 1/3 cu.ft. each) plus 0.41 million damaged bound volumes	
3. Units consisting entirely of impermanent copies	1.6%
4. Units whose contents show no evidence of damage or potential damage (except for possibly needing holdings maintenance - item 2)	28.1%
5,8,11. Units for which copies of the contents are currently available for use by researchers	3.8%
9,12a. Homogeneous groups of documents that are relatively easy to microcopy	2.9%
12. Documents in need of laboratory repair to facilitate copying	0.2%

6,7,10,11,13. Documents to be appropriately treated through intercept programs, when activated by use:	
Impermanent copies	4.7%
Damaged special media	0.2%
Major damage (from Q16)	4.7%
Loss of information	0.1%
Oversized (larger than 4 square feet)	0.8%
Newsprint/ground-wood paper	3.5%
Brittle paper	6.8%
OK - Documents not having any of the above use-related problems	37.8%

The holdings maintenance category, item number 2 above, is an important component of preservation cost estimates. For the survey population, which is only part of the total NARS textual holdings, the cost of holdings maintenance can be itemized as follows:

Shrink-packaging	
(0.41 million books) x (\$0.50 per book)	= \$ 0.2 million
Archives boxes	
(2.55 million archives boxes) x (\$9.00 per box)	= \$23.0 million
	<hr/>
Total	\$23.2 million

Since these figures apply to 84.5% of the survey population (0.95 million cubic feet), the cost per cubic foot, averaged over bound volumes and archives boxes is

$$(\$23.2 \text{ million}) \div (0.95 \text{ million cu. ft.}) \cong \$24.40 \text{ per cu. ft.}$$

This average cost of \$24.40 per cubic foot is used on page 10 to estimate the total cost of holdings maintenance over the twenty-two year program.

Acknowledgements

The statistical survey of textual records would have been impossible to carry out were it not for the excellent help and cooperation of several individuals. At NARS, Eric Bechtel, Ann Elam, and Jimmy Rush implemented the sample selection and data collection. At NBS, Janet Couch did a remarkably efficient and accurate job of data entry and encoding to transform the checklist data into machine-readable form. Also at NBS, Dr. Karen Kafadar helped with the planning of this survey, and Shirley Bremer helped with organizing the checklist forms and maintaining the computerized data base. All these efforts are gratefully appreciated.

Exhibit 1

Some Coarse Features of the Population Surveyed.

Nonsurvey material	41,000 cu. ft.	(3.7%)
Unused portion of boxes	46,500 cu. ft.	(4.1%)
Disposable material	25,900 cu. ft.	(2.3%)
Textual material of interest	1,007,900 cu. ft.	(89.9%)
Total	1,121,300 cu. ft.	(100%)

Exhibit 2

Checklist Form Used to Record Survey Data

Sequence Number _____

CHECKLIST FOR FY 1983 NBS PRESERVATION SURVEY
OF MAPS PAPER TEXTUAL HOLDINGS

PART I (To be completed by archival staff)

SURVEYOR _____ TODAY'S DATE _____

RG _____ SERIES TITLE _____

SERIES DATE SPAN _____ LENGTH OF SERIES (linear) _____

DATE SPAN OF DOCUMENTS SAMPLED _____

1. Disposable Series YES NO
[] [] [] []

2. Intrinsic Value YES NO
[] [] [] []

a. If "Yes", then which specific characteristics or qualities does it contain (see SIP 21):
1 2 3 4 5 6 7 8 9
[] [] [] [] [] [] [] [] []

b. If "No" and 14a indicates presence of colored inks, are the colors significant? [] [] YES NO

c. Do the characteristics of intrinsic value apply to the series or the sample unit only? Series Unit Only
[] []

3. USE: at least once a month ... [] at least once a year ... [] less than once a year []

4. In MAPS A-1 YES NO
[] []

5. Microfilmed YES NO
[] []

6. Published (other than by microfilm) ... [] [] YES NO

Change 9d second part to "Yes" if folders are needed for arrangement control.

PART II (To be completed by preservation staff)

SURVEYOR _____ TODAY'S DATE _____

STACK AREA _____ ROW _____ COMPARTMENT _____ SHELF _____ SEVENTH _____

BOX/VOL LABEL _____

ID. NO. OF FOLDER SELECTED _____ TOTAL NO. OF FOLDERS _____

ESTIMATING GUIDE

(Few) = 5% or less.
(1/4) = about one quarter of the contents.
(1/2) = about one half of the contents.
(3/4) = about three quarters of the contents.
(All) = almost all of the contents 95% or more.

2

7. Sample Unit size 1/3 cu. ft. 1 cu. ft. Vols (No. of Vols) OTHER
If vols. or other give ... height ... depth ... thickness [] [] []

8. Loose paper (Few) (1/4) (1/2) (3/4) (All)
[] [] [] [] []

9. Housing of loose papers

a. Container Archives Box FPC Box Tray drawer Other (Specify other) _____
[] [] [] [] []

b. Overloaded YES NO
[] []

c. Quality of container ... GOOD FAIR POOR
[] [] []

d. Folders used YES NO If "No", are they needed YES NO
[] [] [] []

e. Condition of the Folders Acid Non-acidic
[] []

10. Bindings of volumes Indicate the Volume Number in each Category

a. Type of binding: (Library) (Unique/Historic) (Ledger) (Post)
[] [] [] []

b. Covering material: (Bookram) (Cloth) (Paper) (Leather)
[] [] [] []

c. Minor red rot f. Spine detached
[] []

d. Major red rot g. Minor sewing damage ...
[] []

e. Loose binding h. Major sewing damage ...
[] []

1. Improperly shelved ... []

11. Paper size (Few) (1/4) (1/2) (3/4) (All)

a. Index cards [] [] [] []

b. smaller than letter [] [] [] []

c. letter/legal [] [] [] []

d. larger than legal but under 4 sq. ft. [] [] [] []

e. 4 sq. ft. and larger [] [] [] []

Exhibit 2 (Continued)

3.	4								
12. Type of Support	(Few)	(1/4)	(1/2)	(3/4)	(A11)				
a. newsprint/ground wood	[]	[]	[]	[]	[]				
b. tissue paper	[]	[]	[]	[]	[]				
c. handmade paper	[]	[]	[]	[]	[]				
d. book/writing paper	[]	[]	[]	[]	[]				
e. parchment	[]	[]	[]	[]	[]				
f. other (specify _____)....	[]	[]	[]	[]	[]				
13. Type of media	(Few)	(1/4)	(1/2)	(3/4)	(A11)				
a. handwritten	[]	[]	[]	[]	[]				
b. typewritten	[]	[]	[]	[]	[]				
c. printed text	[]	[]	[]	[]	[]				
d. press copies	[]	[]	[]	[]	[]				
e. impermanent copies	[]	[]	[]	[]	[]				
f. photographs	[]	[]	[]	[]	[]				
g. drawings	[]	[]	[]	[]	[]				
h. hand-colored printed maps ..	[]	[]	[]	[]	[]				
i. other (specify _____)....	[]	[]	[]	[]	[]				
j. damaged special media	[]	[]	[]	[]	[]				
14. Use problems	(Few)	(1/4)	(1/2)	(3/4)	(A11)				
a. colored inks	[]	[]	[]	[]	[]				
b. faint image	[]	[]	[]	[]	[]				
c. brittle	[]	[]	[]	[]	[]				
d. folded	[]	[]	[]	[]	[]				
e. rolled	[]	[]	[]	[]	[]				
f. homogeneous format	YES []	NO []							
15. Previous treatment	(Few)	(1/4)	(1/2)	(3/4)	(A11)				
a. laminated	[]	[]	[]	[]	[]				
b. laminated w/out tissue	[]	[]	[]	[]	[]				
c. sliken	[]	[]	[]	[]	[]				
d. other (specify _____)....	[]	[]	[]	[]	[]				
16. Major damage by:	(Few)	(1/4)	(1/2)	(3/4)	(A11)				
a. tears/breaks	[]	[]	[]	[]	[]				
b. water/mold	[]	[]	[]	[]	[]				
c. acidic ink	[]	[]	[]	[]	[]				
d. tape	[]	[]	[]	[]	[]				
e. glue/paste	[]	[]	[]	[]	[]				
f. corrosion stains	[]	[]	[]	[]	[]				
g. other (specify _____)...	[]	[]	[]	[]	[]				
17. Loss of information	[]	[]	[]	[]	[]				
18. Abundant loose dirt/dust on document:			YES []	NO []					
19. % unused (blank pages or part empty) _____ %			YES []	NO []					
20. Active mold, insects, or rodents			YES []	NO []					

Exhibit 3

Summary of Individual Items on Checklist Form, in Percent*

Note: The category labeled "Missing" refers to missing data on the survey form.

	<u>Yes</u>	<u>No</u>	<u>Missing</u>	
Q1 Disposable?	2.3	89.9	--	
Q2 Intrinsic Value?	20.4	68.2	1.3	
Q2b Sign Colored Ink?	5.8	50.7	33.4	
Q2c Int. value refers to:	Series=36.3	Unit=1.4	Missing=52.2	
	<u>At least Monthly</u>	<u>At least Yearly</u>	<u>Less than Yearly</u>	<u>Missing</u>
Q3 Use:	20.0	30.4	36.5	3.0
	<u>Yes</u>	<u>No</u>	<u>Missing</u>	
Q4 In NARS A-1	14.3	74.8	0.8	
Q5 Microfilmed	4.0	84.9	1.0	
Q6 Published	0.8	88.8	0.3	
Q7 Size of Unit	<u>1/3 cu. ft.</u>	<u>1 cu. ft.</u>	<u>Volumes</u>	<u>Other</u>
	51.0	14.5	12.6	11.8

No. of Volumes: Est'd Total = 950,000 bound values
(±350,000 allowance for sampling error)

							<u>Weighted</u>
	<u>None</u>	<u>Few</u>	<u>1/4</u>	<u>1/2</u>	<u>3/4</u>	<u>All</u>	<u>Average</u>
Q8 Loose Paper	13.7	0.2	0.0	0.3	0.2	75.4	73.9

[Note: 13.7% "None" includes bound volumes standing alone and found inside boxes. Q7 says only 12.6% have primary housing as bound volume.]

*All percents are relative to TOTAL = 1.12 million cu. ft.
(Therefore sum of percents is 89.9% , see Exhibit 1.)

Exhibit 3 (continued)

Q9 Housing of Loose Papers

	<u>Archives Box</u>	<u>FRC Box</u>	<u>Tray</u>	<u>Roller Drawer</u>	<u>Other</u>	<u>Missing</u>
Q9a Container	51.2	14.4	1.8	1.6	8.3	12.5
Q9b Overloaded	<u>Yes</u> 3.6	<u>No</u> 72.8	<u>Missing</u> 13.6			
Q9c Quality of Container	<u>Good</u> 4.6	<u>Fair</u> 47.9	<u>Poor</u> 24.2	<u>Missing</u> 13.2		
Q9d Folders Used	<u>Yes</u> 55.6	<u>No</u> 21.9	<u>Missing</u> 12.4			
Q9d-2 If "No" Are they Needed?	<u>Yes</u> 14.7	<u>No</u> 7.1	<u>Missing</u> 68.1			
Q9e Condition of Folders	<u>Acid</u> 54.9	<u>Non-acid</u> 0.8	<u>Missing</u> 34.2			

Q10 Bindings of Volumes (% relative to total no. of volumes = 950,000, see Q7)

Q10a Type of binding	<u>Library</u> 88.1	<u>Unique/Hist</u> 0	<u>Ledger</u> 0	<u>Post</u> 8.6	<u>Missing</u> 3.2
Q10b Covering mat'l	<u>Buckram</u> 13.2	<u>Cloth</u> 35.3	<u>Paper</u> 2.8	<u>Leather</u> 48.7	<u>Missing</u> 0
Q10c Minor red rot:	yes=20.0% (Yes) (\pm 17%)				
Q10d Major red rot:	yes=30.2% (\pm 19%)				

Q10 Bindings of volumes, continued (% refers to total no. of volumes, = 950,000)

Q10 Loose Binding:	Yes = 23.8%
Q10f Spine Detached:	Yes = 17.9%
Q10g Minor Sewing Dmg.:	Yes = 2.1%
Q10h Major Sewing Dmg.:	Yes = 0.7%
Q10i Improperly Shelved:	Yes = 14.4%

Exhibit 3 (continued)

Q11 Paper Size

	<u>None</u>	<u>Few</u>	<u>(1/4)</u>	<u>(1/2)</u>	<u>(3/4)</u>	<u>All</u>	Wtd.** <u>Avg.</u>
Q11a Index Cards	88.3	.2	.06	.06	0	1.3	1.3
Q11b Smaller than letter	39.0	22.1	22.1	2.8	1.7	2.1	8.8
Q11c Letter/ Legal	11.6	1.7	3.4	5.4	25.1	42.7	66.1
Q11d Larger than legal but < 4 sq ft	58.6	13.5	6.3	1.2	2.2	8.1	11.6
Q11e > 4 sq ft	88.5	1.7	0.9	0.2	0.1	0.4	0.8

Q12 Type of Support

Q12a Newsprint	68.3	13.4	4.3	1.6	1.4	0.8	3.8
Q12b Tissue paper	34.9	13.9	22.5	11.8	4.0	2.8	15.8
Q12c Handmade paper	88.4	0.32	0.15	0.15	0.25	0.66	0.96
Q12d Book/ writing	3.2	3.2	5.6	14.8	20.6	42.6	67.3
Q12e Parchment	89.5	0.09	0.15	0.15	0	0	0.096
Q12f Other (mostly: photostats, blueprints, telegrams)	87.7	1.3	0.26	0.28	0	0.36	0.56

** Based on midpoint of each interval, e.g. "few" = 0 to 5% + 2.5%, etc.
(see narrative)

Exhibit 3 (continued)

Q13 Type of Media

	<u>None</u>	<u>Few</u>	<u>(1/4)</u>	<u>(1/2)</u>	<u>(3/4)</u>	<u>(All)</u>	<u>Avg.</u>
a - handwritten	22.3	12.4	11.7	8.5	9.2	25.8	39.3
b - typewritten	22.6	6.7	8.0	10.1	17.2	25.2	45.7
c - printed text	21.7	8.7	13.1	10.8	15.1	20.5	40.4
d - press copies	84.7	2.4	1.6	0.3	0.1	0.7	1.3
e - impermanent	56.0	14.5	9.7	5.5	2.4	1.7	8.3
f - photographs	82.9	5.0	1.4	0.3	0.1	0.2	0.7
g - drawings	86.5	3.0	0.3	0	0	0.1	0.3
h - hand colored print maps	87.3	2.6	0	0	0	0	0.07
i - other	72.0	11.5	3.9	0.9	0.6	1.0	2.8
j - damaged special media	89.7	0.04	0.1	0	0	0	0.02

Q14 Use Problems

a - colored inks	21.5	9.3	15.9	14.8	12.9	15.4	36.0
b - faint image	85.2	4.6	0.5	0.6	0	0	0.5
c - brittle	61.6	10.6	8.4	4.7	0.4	4.1	8.2
d - folded	49.7	15.1	11.3	2.9	1.9	9.0	13.3
e - rolled	89.3	0.2	0.07	0	0	0.3	0.3
f - homog. format	Yes = 32.2		No = 57.7				

Q15 Previous Treatment

a - laminated	89.4	0.15	0.35	0	0.01	0.02	0.08
b - lamin. w/o tissue	89.58	0.05	0.08	0.09	0	0.09	0.14
c - silked	89.9	0	0	0	0	0	0
d - other	83.1	5.9	0.6	0	0	0.2	0.44

Q16 Major Damage by...

a - tears/breaks	61.5	24.1	2.7	1.0	0.07	0.50	2.1
b - water/mold	87.9	1.0	0.3	0.2	0.2	0.3	0.64
c - acidic ink	89.2	0.7	0	0	0	0	0.02
d - tape	81.3	7.2	0.8	0.4	0.05	0.17	0.7
e - glue/paste	82.0	6.0	0.7	0.6	0.15	0.44	1.3
f - corrosion stains	71.9	14.0	3.1	0.8	0.04	0.05	1.3
g - other	89.4	0.16	0.17	0.05	0.05	0.09	0.2

Q17 Loss of

Information	85.4	4.5	0.01	0	0	0	0.11
-------------	------	-----	------	---	---	---	------

Q18 Abundant Dirt

Yes = 10.0

No = 79.8

Missing = 0.06

Q20 Active Mold,

Yes = 0.07

No = 89.6

Missing = 0.2

Insects, Rodents

Exhibit 4

Guidelines for Evaluating Statistical Uncertainties
in Estimated Percentages for Exhibits 3 and 5

If the estimated percentage is:	The uncertainty is about:
less than 1%	the same as the estimated percentage
1% to 2%	0.5%
2% to 10%	1.5%
10% to 20%	2.5%
20% to 30%	3.5%
more than 30%	4.0%

Exhibit 5

Simplified Flow Chart Representing Long Range Preservation Program and Showing Survey-Estimated Percentages in Each Category.

(Percents do not add to 100 due to overlap among some categories.)

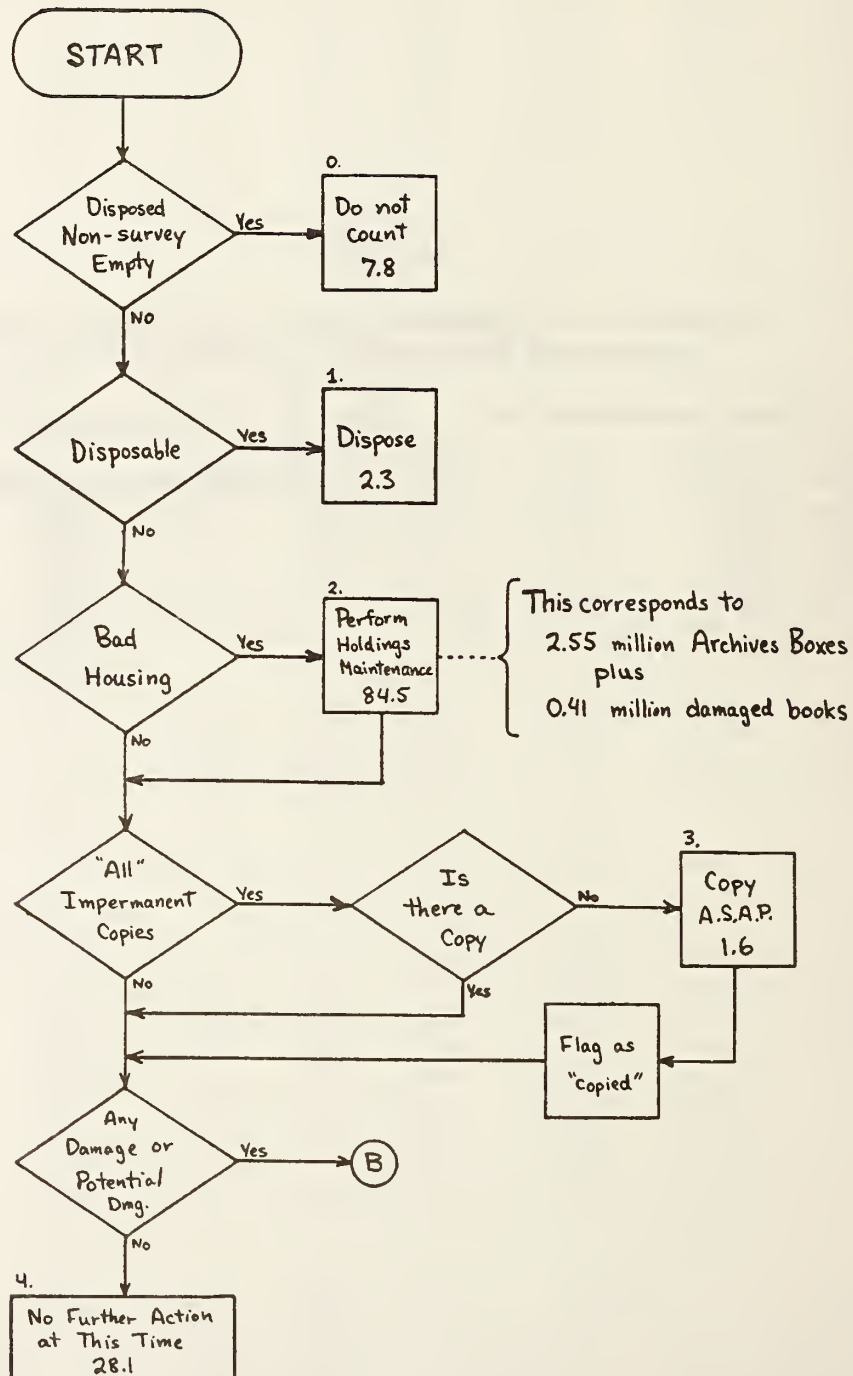
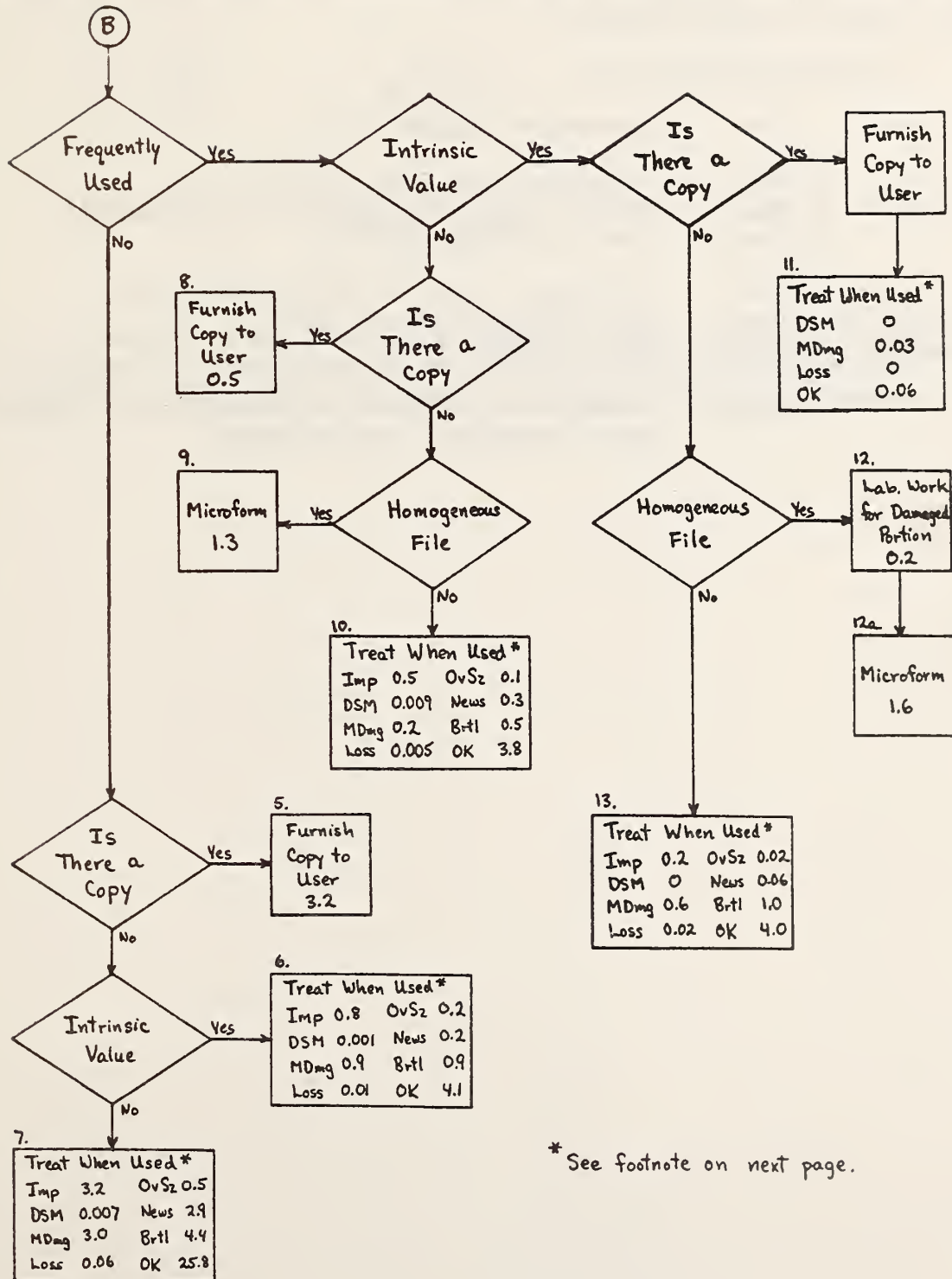


Exhibit 5 (continued)



* See footnote on next page.

* Footnote for Exhibit 5

"Treat When Used" means that units corresponding to the indicated box will be treated only when activated by use (if at all.) Depending on the nature of the records (e.g. intrinsic value, frequency of use, etc.), the action taken for a given category may vary.

The abbreviations are:

	Imp	= Impermanent copies, Q13e
"Damage"	DSM	= Damaged Special Media, Q13j
	MDmg	= Major Damage, Q16 combined (see narrative)
	Loss	= Loss of Information, Q17
"Potential Damage"	OvSz	= Oversized, 4 sq. ft. and larger, Q11e
	News	= Newsprint/Ground Wood, Q12a
	Brtl	= Brittle, Q14c
	Other	= Conservative estimate of percentage not in any of the above categories (see narrative)

APPENDIX B

BUDGET CHARTS

Note: All of Appendix B is an historic document. These tables and charts were submitted through GSA to OMB as a part of the FY 1986 budget submission. The figures and charts are labeled, "20 year preservation plan."

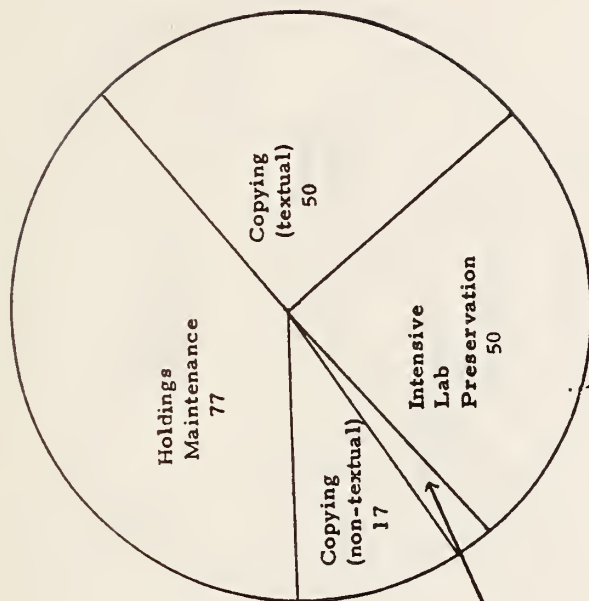
NARS 20 Year Preservation Plan: Backlog and Accessions

<u>Textual</u>	<u>1984</u>			<u>1985</u>			<u>1986</u>			<u>1987-2005 (annual rate)</u>		
	units	FTE	\$,000	units	FTE	\$,000	units	FTE	\$,000	units	FTE	\$,000
Treatment Needed												
1. Holdings Maintenance (cu. ft.)	25,000	16	812	55,000	42	1,400	120,000	107	3,100	90,000	77	2,223
2. Copy (pages)	3,750,000	11	791	4,761,000	20	1,215	5,500,000	26	1,700	9,000,000	50	2,379
3. Intensive Laboratory (pages)	136,000	13	830	150,000	16	915	175,000	21	1,165	661,000	50	2,819
4. Research		3	890		4	1,045		4	1,120		4	1,069
<u>Non-Textual</u>												
Treatment Needed												
1. Copy (still pictures, tapes, movies, etc.)	3,764,000	7	1,117	2,090,000	9	1,010	2,500,000	9	1,500	3,070,000	17	2,755
Total		50	4,440		91	5,585		167	8,585		198	11,245
<u>Special projects</u>												
JPL Charters of Freedom			1,399									
House and Senate			576									
Grand Total			6,415			5,585			8,585			11,245

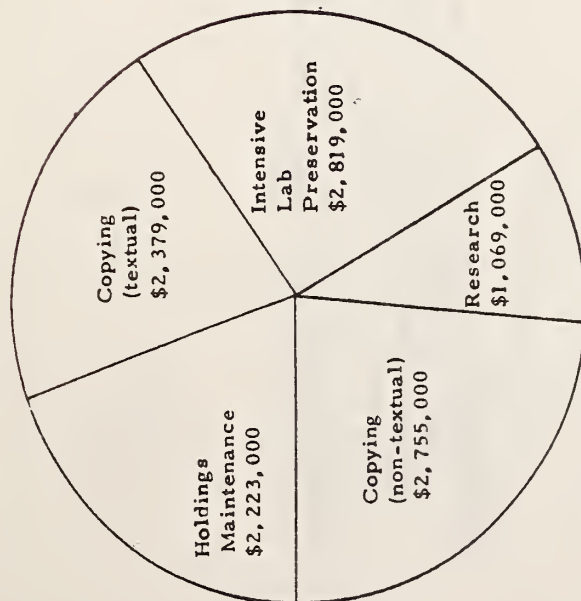
NARS 20-Year Preservation Plan: Fiscal Years 1987-2005

DOLLARS

FTE



Totals - \$11,245,000 and 198 FTE



Textual records

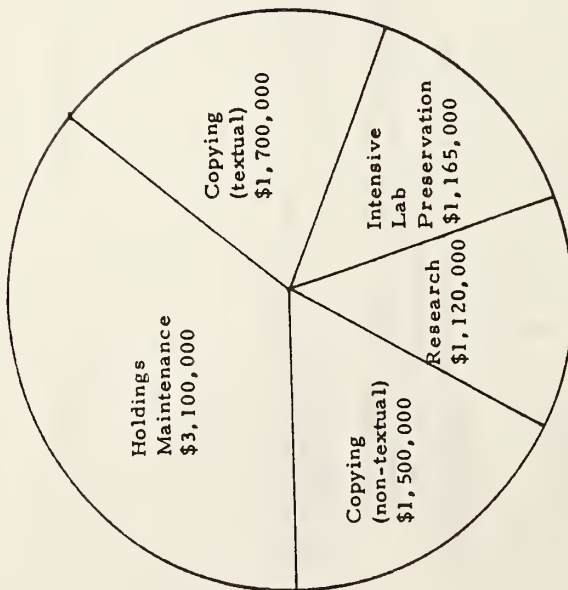
- Holdings maintenance - 90,000 cubic feet
- Copying - 9,000,000 pages
- Intensive laboratory preservation - 661,000 pages
- Laboratory research - within NARS and contracts

Non-textual records

- Copying (still pictures, tapes, movies, etc.) - 3,070,000 units

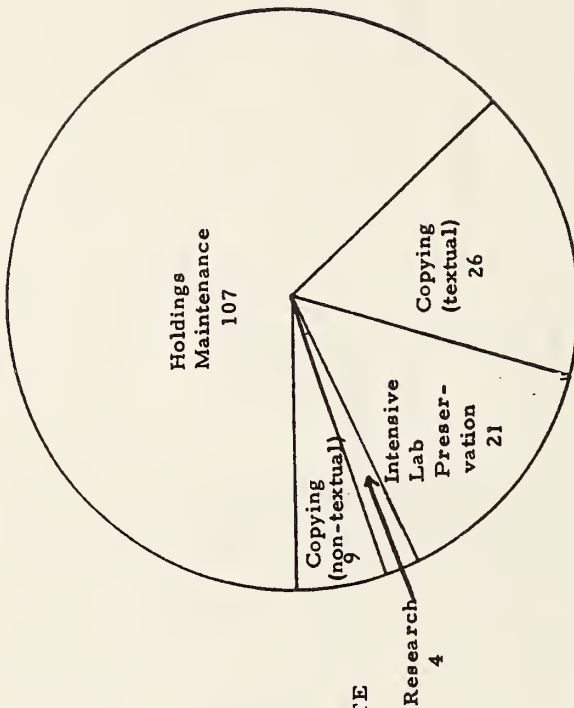
NARS 20-Year Preservation Plan: Fiscal Year 1986

DOLLARS



Totals - \$8,585,000 and 167 FTE

FTE



Textual records

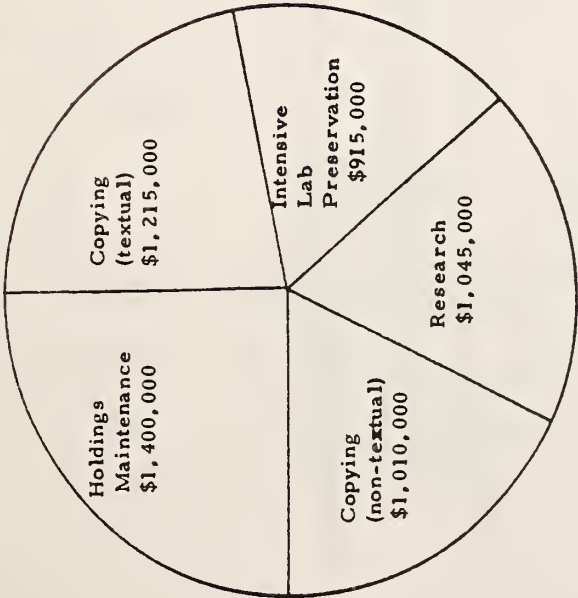
- Holdings maintenance - 120,000 cubic feet
- Copying - 5,500,000 pages
- Intensive laboratory preservation - 175,000 pages
- Laboratory research - within NARS and contracts

Non-textual records

- Copying (still pictures, tapes, movies, etc.) - 2,500,000 units

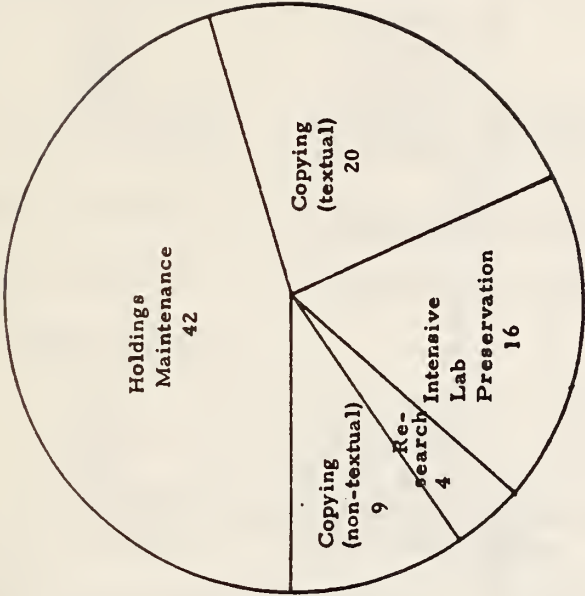
NARS 20-Year Preservation Plan : Fiscal Year 1985

DOLLARS



Totals-\$5,585,000 and 91 FTE

FTE



Textual records

- Holdings maintenance - 55,000 cubic feet
- Copying- 4,761,000 pages
- Intensive laboratory preservation - 150,000 pages
- Laboratory research - within NARS and contracts

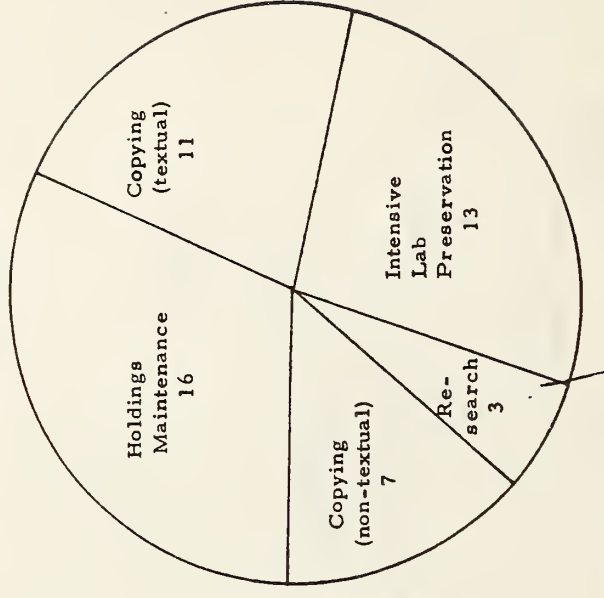
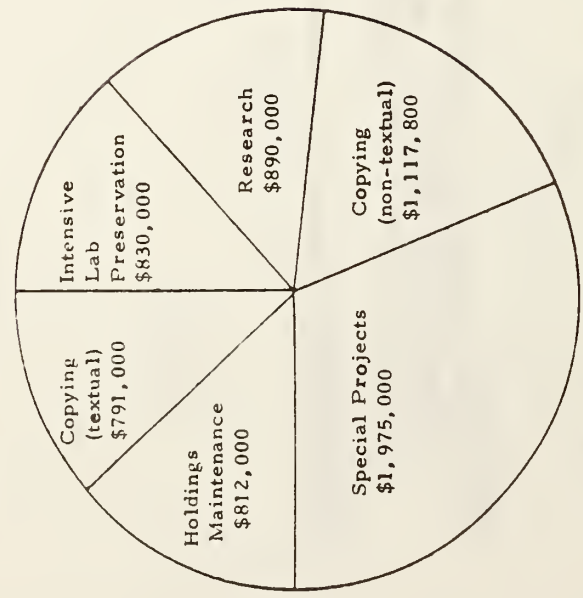
Non-textual records

- Copying (still pictures, tapes, movies, etc.) - 3,764,000 units

NARS 20-Year Preservation Plan: Fiscal Year 1984

DOLLARS

FTE



Totals - \$6,415,000 and 50 FTE

Textual records

- Holdings maintenance - 25,000 cubic feet
- Copying - 3,750,000 pages
- Intensive laboratory preservation - 136,000 pages
- Laboratory research - within NARS and contracts

Non-textual records

- Copying (still pictures, tapes, movies, etc.) - 3,764,000 units

Special projects

- Charters of Freedom (JPL contract - \$1,399,000
- House and Senate records - \$576,000

NARS 20 YEAR PRESERVATION PLAN: TOTAL BACKLOG AND ACCESSIONS

TEXTUALHoldings Maintenance (cu. ft.)

1984	25,000	
1985	55,000	
1986	120,000	
1987-2005	<u>1,710,000</u>	(90,000 x 19)
Total Workload	1,910,000	cu. ft.
New Accessions	<u>-748,000</u>	(34,000 x 22)
Total Backlog	1,162,000	cu. ft.

Copy (pages)

1984	3,750,000	
1985	4,761,000	
1986	5,500,000	
1987-2005	<u>171,000,000</u>	(9,000,000 x 19)
Total Workload	185,011,000	pages
Total Accessions	<u>-38,016,000</u>	(1,728,000 x 22)
Total Backlog	146,995,000	pages

Laboratory Treatment (pages)

1984	136,000	
1985	150,000	
1986	175,000	
1987-2005	<u>12,559,000</u>	(661,000 x 19)
Total Workload	13,020,000	pages
New Accessions	<u>--</u>	
Total Backlog	13,020,000	pages

NON-TEXTUALCopy (units)

1984	3,764,000	
1985	2,290,000	
1986	2,500,000	
1987-2005	<u>58,330,000</u>	(3,070,000 x 19)
Total Workload	66,884,000	units
New Accessions	<u>-41,602,000</u>	(1,891,000 x 22)
Total Backlog	25,282,000	units

FY 85 PRESERVATION

MICROFILMING/ELECTROSTATIC (TEXTUAL COPYING)

	<u>DOLLARS</u>	<u>UNITS</u>
15 FTE in the stacks and mics supplies	\$510,000	
5 FTE in NNP and other lab costs	\$380,000	2,400,000
Contract filming*	\$325,000	2,361,000
TOTAL	\$1,215,000	4,761,000

NON-TEXTUAL PRESERVATION

	<u>DOLLARS</u>	<u>UNITS</u>
Motion Pictures	\$570,000	1,300,000
Microfilm duplication	\$ 40,000	480,000
Magnetic Media	\$200,000	150,000
Still Pictures	\$200,000	160,000
TOTAL	\$1,010,000	2,090,000

*Includes work done at WNRC and in the Federal Archives and Records Centers as well as by private contractors.

APPENDIX C

**Instructions for Completing Checklist for FY 83 Preservation Survey
of NARS Textual Holdings**

INSTRUCTIONS FOR COMPLETING CHECKLIST FOR FY 83
PRESERVATION SURVEY OF NARS TEXTUAL HOLDINGS

PART I (to be completed by archival staff)

Heading: Surveyor of Part I identifies himself/herself, fills in the date, record group number, series title, beginning and ending date of series, length of the series in linear feet or inches, date(s) of sample units, and checks the following information previously filled in by the staff of NNPD of Part II: stack area, row compartment, shelf, which seventh position on the shelf is occupied by the sample unit, and the box or volume label. The sample units are identified by large (3/4") red dots. It is particularly important that the date(s) of the sample unit reflect the contents of the sample unit only, and that they should be as precise as possible.

The answers to questions 1, 2, and 3 should be based on the judgment of the surveyor. The answer to question 2 also should be based on Staff Information Paper 21.

1. Disposable series: The surveyor should answer "yes" if the series in which the sample unit belongs has either (a) already been identified for internal disposal, or (b) is likely to be proposed for internal disposal.
2. Intrinsic Value: The surveyor should first evaluate the intrinsic value of the series to which the sample unit belongs. If the series is determined to have intrinsic value according to the guidelines of SIP 21, indicate "yes." If the surveyor concludes that the series does not have intrinsic value, he should

then determine whether the sample unit alone has intrinsic value. If so, indicate "yes." If neither the series nor the sample unit alone have intrinsic value, indicate "no." For example, if the sample unit is the "E" file of a series of alphabetical subject file and appears to have no intrinsic value standing on its own, but does have intrinsic value when considered a part of the larger "A-Z" series then the answer is "yes," it has intrinsic value. The surveyor may also determine that the sample unit has intrinsic value (because of special physical characteristics, for example), even though the series of which it is a part does not have intrinsic value.

2b. If the answer to questions 14a indicates the presence of colored inks, indicate whether the colors are essential to understanding the records.

3. Use: It is recognized that in many cases the answers to this question will depend upon the archivist's knowledge of the series generally, rather than the specific sample unit. Nevertheless, whenever you have information about the sample unit that differs from an evaluation of the series as a whole, answer for the unit. For example, if you estimate that a given series is used at least once a month, but the unit selected from that series is thought to be used less than once a year, the answer should be less than once a year.

4. and 5. Self explanatory.

6. Published: If the overwhelming number of documents in the sample unit have been published, or are themselves published items, and are widely available, check "yes."

PART II (to be completed by conservation staff)

Heading: Surveyor of Part II identifies herself/himself and records today's date; writes down the stack location in the format: stack area, row, compartment, shelf, and identifies which seventh position on the shelf is occupied by the sample unit and copies the label information when available

Each item in the checklist describes a single aspect of the physical condition or composition of records in a sample unit. Some items provide a simple option, for example "Yes/No". Some items provide one or more blanks for filling required data. These data may consist of specific measurements. Frequently, documents in a given sample unit are diverse enough to satisfy more than one attribute or characteristic. In such cases, the estimated proportions of each type of document must be indicated.

Brief descriptions of individual items and guidelines for collection data follow:

For estimating proportions of the sample unit contents having particular attribute use the following code:

(Few) = about 5% or less.

(1/4) = about one quarter of the contents (6-34%).

(1/2) = about one half of the contents (35-65%).

(3/4) = about three quarters of the contents (66-95%)

(All) = about all of the contents (96-100%).

IF THE SAMPLE UNIT CONTAINS NONE OF WHAT IS ASKED THEN SKIP THE QUESTION.

ITEM 7. If unit consists of a Hollinger-type storage box, or a container that approximates the size of such a box, check "1/3 cu. ft." For larger storage boxes of corrugated board, such as those used in WNRC, Suitland, check "1 cu. ft." For all other containers, check "other" and record the dimensions (length, width, thickness) in inches. For rolled documents the width and thickness are assumed to be identical to the diameter.

ITEM 8. Proportion of loose documents. If sample consists of only bound volumes do not mark the form.

ITEM 9. Housing of loose documents.

- a. Container type: Check the appropriate box to indicate the type of container used. Archives box (like a Hollinger box), FRC box, metal tray (the pull-out kind), roller drawer (used for index cards and sometimes for oversized loose or bound materials), and other. If other, then specify type.
- b. A container is overloaded if the contents are being damaged from pressure or could be damaged when they are removed from the container for use.
- c. Condition of container is "bad" if they are stored in containers (other than painted metal) that do not provide neutral (ph=7) or better conditions for the document. Hollinger-type archives boxes or boxes of similar paperboard construction are "good" if they are new gray, new dark brown, or yellow. They are "fair" if they are in older but undeteriorated Hollinger-type archives boxes. All kraft paper (brown grocery-bag-like paper) and corrugated cardboard boxes are "bad". (Folders are not considered housing in this section).

New Hollinger type boxes are considered good housing only if the interior of the box is lined with non-acidic papers. A Hollinger box that is labeled non-acidic is considered acidic (and fair housing) if its interior is of uncovered kraft material. Old but undeteriorated archives boxes are fair housing.

A roller drawer is poor housing when the materials it houses extend above the height of the drawer. A roller drawer is poor housing when there is no shelf in drawer directly above it to protect its contents from dirt.

A roller drawer should not be considered housing at all when it contains materials that are boxed, or when the materials are in folders or envelopes that extend five inches or more above the height of the drawers. A drawer in these circumstances is no more than a shelf.

d. Folders or envelopes used? Yes or No. Are there any folders in the sample unit? If no, then answer if they are in need of safer containment and maintenance of arrangement and control. In the case of folded documents, for example, folders are needed if the documents are to be unfolded.

e. Condition of folders: Folders are acidic unless they are labeled non-acidic, or are non grayish-green in color and bear the imprint of the manufacturer. Folders made from unbleached kraft pulp, generally distinguishable by their familiar brown color, are acidic. Non-acidic, ("No" answer) or acid-free folders generally have grayish color but could be white or yellowish cream in color and usually carry the imprint of the manufacturer.

ITEM 10. Bindings of volumes (skip this item if the same unit does not contain bound volumes).

Indicate the volume number found in the sample unit in each category below (numbering the volumes from left to right):

a. Identify the type of binding.

Library - All case and fine bindings that are not unique/historic.

Unique/Historic - (1) Any type of binding that is the original housing of a historic treasure. (2) A binding that has rare, special, or unique qualities.

Ledger - A specific type of binding with cord ridges on the spine, hollow back and sewn so the pages lie completely flat.

Post - Individual pages held together by the posts that extend through holes in the covers and pages. The unit can be disassembled by removing the posts. Add to this category three-ring binders and any type of binding from which the support can be easily removed and replaced. NOTE: three-ring binders housed in boxes will be considered loose materials.

b. Identify the type of covering:

Buckram - Cover material; that is usually starch or pyroxylin filled cloth.

Cloth - Cover material.

Paper - Material.

Leather - Cover material; animal skin.

c and d. Red Rot - Damage to leather covering material. Chemical imbalance within leather has resulted in degradation of the leather. The leather falls off or is rubbed off. When rubbed with cloth usually leaves behind a red or brown mark, that can be dusted away. Minor red rot is confined to the surface of less than one fourth of the binding. Major red rot permeates the leather and covers over one fourth of the cover; in most cases books will require rebinding. If in doubt, damage is major.

e. Loose Binding - General term to indicate that the text block is not firmly attached to the covers. Minor forms of many problems may contribute to make a loose binding.

f. Spine Detached - One or both sides of the spine's attachments to the cover and text block is broken, or very close to being broken.

g. and h. Sewing damage - Sewing has broken from stress or use. Sewing could be in an abraded condition so that it is very close to being broken. Minor sewing damage will require only a small amount of time during rebinding to do a repair. Major sewing damage will require complete resewing.

i. A Volume - Is improperly shelved if it is resting on the foreedge or spine rather than its tail (spine vertical and facing out) or cover (spine horizontal and facing out) unless the volume is oversized, or if it could be damaged when it is removed from the shelf. A container is improperly shelved if the

contents could be damaged from storage or from access.

ITEM 11. Paper size.

Record best estimate of proportion of: (a) index cards, (b) smaller than letter size paper. (c) letter/legal--between 8-8 1/2 x 11" and 8" - 8 1/2" x 14" in size. (d) larger than legal--larger than 8 1/2" x 14 but smaller than 4 square feet. (e) four square feet and larger. This is for unusually oversized paper.

ITEM 12. Type of support.

The purpose of this section is to determine the relative proportions of support (paper) types in the sample unit. Certain support types degrade rapidly (newsprint/groundwood) or require special handling (press copies and parchment) Knowing the proportions of these types will be helpful in developing more accurate preservation plans.

- a. Newsprint/groundwood - Newsprint type paper.
- b. Tissue paper - Thin translucent paper of any color.
- c. Handmade paper - Made by hand, using good quality materials on a papermakers mold. Should have either antique laid, laid or woven pattern when viewed by transmitted light. Handmade papers are generally not uniform in details such as thickness and structure and often display deckle edges.
- d. Book/writing paper - Made on a machine. When viewed by transmitted light will have a basic woven pattern usually arranged in diagonal lines; could also

have an artificial laid pattern transposed into the basic woven pattern. Machine made papers are generally very uniform.

e. Parchment - Animal skins.

f. Cther - Give short explanation of material such as drafting cloth, drafting plastic, metal foil, cloth etc.

ITEM 13. Type of media.

The purpose of this information is to determine the complexity of the record/document/artwork/etc., if it has to be treated for damage. If all or part of the sample is hectograph, thermofax or dilux it is impermanent and will need to be scheduled for copying, not treatment. If photographic material, drawings, colored drawings or printed maps with hand-coloring are found, the material will need more detailed examination; if damaged will need special treatment requiring considerably more care and time than normal records.

The original media of a copied document is not recorded. It is only necessary to note that a copy of an original document is present. It is not necessary to record whether the document is a copy of handwritten, typewritten, or printed media. It should be noted that often copied materials contain other media which then are recorded. For example, copied forms may have typing or handwriting on them.

All of these copies have been considered impermanent copies except photostatic copies, photostats, and blueprints which are recorded on the form under (13i). Press copies are recorded separately. Telegrams in colored ink have been

considered typewritten. If colored inks were used in the copying process, it is recorded under (14a).

- a. Handwritten - Registers, fair copies, logs, letters etc.
- b. Typewritten -
- c. Printed text - Like a library book.
- d. Press copies - Copies of original ink documents (usually letters) using moisture and pressure to transfer a portion of the ink on to the tissue paper.
- e. Impermanent copies, such as hectograph, thermofax, dilux and ditto.

Hectograph - Early process that can resemble a "ditto." the printing is usually larger, less uniform and less permanent, color is generally purple or blue. Thermofax - A heat actuated copying process that produces an image that is brown to black with fuzzy outline on a coated paper. The paper is usually curled towards the coated side. The coated side is generally lighter in color than the uncoated side. Dilux - An implemented copy. Ditto - Made from a "ditto" master on a stencil machine, ink is usually purple.

- f. Photographs - Any material made using the normal photographic processes, exemplified by a black and white print or color print on single or double weight paper.

- g. Drawings - An image made using standard artist or draftsmen materials exemplified by architectural drawings, draftsmen drawings and freehand

drawings. Architectural drawings are graphite, ink or other design media depicting an architectural subject usually on tracing paper or drafting cloth. Blueprints or diazo prints would be considered copies. Similar to architectural drawings but the subject matter is any technical subject other than architecture. Freehand drawings are drawings not done in the mechanical drafting style, but rather in an artist style. Could be a pictorial or possibly a map.

h. Hand-colored print maps - Printed maps in the sample that have color applied to them after printing, usually water color. The color usually is not uniform and does not evenly conform to the printed outline of the area colored.

i. Specify any other type of media.

j. Damaged special media. Identify the proportion of the entire sample unit composed of damaged special media. Special media being photographs, drawings, and hand-colored printed maps.

ITEM 14. Use problems. Use problems refer to potential damage by handling. When it is necessary, for example, for a researcher to unfold brittle documents then he will most likely cause damage. The lack of use problems, on the other hand, will indicate potential for easy reproduction. For example, unfolded documents of a homogenous format without faint image would be easy to microfilm.

a. Colored Inks - Give best estimate of the proportion of documents with colored inks present on them. Colored pencil marks and colored stamps are included in this category.

- b. Faint Image - Indicate proportion of documents with inks that are so faint to cause difficulty in photocopying or microfilming.

- c. Brittle - Test a few documents selected at one inch intervals for flat or folded documents and at three inch intervals for trifolded documents for brittleness: Bend over a small inconspicuous corner and apply light pressure with fingers to make a crease about one cm. long from one end to the other. Bend this corner over backwards along the same crease. If the corner detaches partially or fully along the crease in this process, the paper is brittle. Record best estimate of percentage of brittle paper.

- d. Folded - The proportion of folded paper is "(A11)" if all documents are folded; skip if all are flat.

- e. Rolled - Answer same manner as "folded" above.

- f. Homogeneous format - Documents in a sample unit are homogeneous if they are uniform in size and format. The "homogeniety" question is intended to determine if the material lends itself easily to microfilming.

ITEM 15. Previous treatment:

- a. Laminated - Indicate proportion, if any, of documents laminated.

- b. Laminated without tissue - Indicate the propotion of the entire sample unit containing laminated documents that were laminated without tissue. When tissue is used it is embedded in cellulose acetate giving the document a slightly milky or hazy look.

- c. Silked - Record best estimate of the proportion of documents that have been silked. In most cases the silking adhesive has lead to damage of the document and should be removed. Silking is identified by the presence of a fine open weave fabric adhered tightly to the surface of the document. Silked documents are often brittle. If the document is broken it is usually in a straight line, parallel to either the horizontal or vertical threads of the silk fabric (threads usually orientated parallel to the edges of the document).
- d. Other - Specify what other treatment might be present.

ITEMS 16. Major damage by:

- a. Tears/Breaks - Major tears/breaks are longer than three inches. Tears are created in relatively strong paper with moderate force. Breaks are created in brittle paper with a minimum of force.
- b. Water/mold. Water - Record only disfiguration caused by water. This will be in the form of "tide lines" which are usually not straight but are curvalinear. The "tide line" usually grades in intensity from very dark at its edge to moderately dark just away from the edge of the water damaged side to no color difference on the unwetted side of the line. The interior of the water damage (surrounded by the "tide line") is usually light but often mottled light and dark in very irregular curved fuzzy edged patterns. Water damage is distinct from mold damage which is often (but not always) brought about by water damage.

Mold - Mold takes many forms. When it is active it usually smells like mildew;

active mold damage should be brought to the attention of the supervisor. The most common form of mold, "foxing" creates primarily cosmetic damage. "Foxing" is discrete (or clumps of) 1/4" to 1/2" diameter "fox" colored fuzzy edged spots. "Foxing" has two causes, mold and iron/cooper inclusions. Mold induced "foxing" is not serious unless active or extensive, therefore for purposes of this survey will be minor unless active or very extensive. Heavy mold damage is usually caused by prolonged wetness or dampness. Large scale (other than "foxing") mold infestations usually leave a green, blue or orange color with small black spots (within the colored area) behind. Often this type of mold softens the paper so it becomes as spongy as a blotter, but weaker. It can also degrade the paper so that the effected portion is so weak it drops away from the less damaged or unaffected areas.

c. Acidic ink - When the ink eats through the paper.

d. Tape - The presence of any self-adhesive tape (such as cellophane tape) whether discolored or not. The presence of any other type of tape that has caused discoloration of the paper. For this section major damage also means abundance of damage that will result in illegibility from obscuring or darkening in time.

e. Glue/Paste - Discoloration of the paper caused by any type of adhesive including glue (animal origin; hide glue) paste (vegetable origin; starch paste) white glue (glue of synthetic origin; Elmer's glue) rubber cement, wax seals, etc. For this section major damage also means abundance of damage that will result in illegibility from darkening in time.

f. Corrosion stains - Documents with rust or other corrosion products from

metal fasteners which can be iron "acco" fastners, paper clips, or rivets and brass paper fastners. Iron or copper corrosion products speed up the oxidation (degradation) of the document. In some cases the fastner and corrosion can be carefully removed; in others the fastner will have to be replaced with a more stable device. In all cases the fastner should not be present if it is not historically correct. The holes left by an original fastner are not considered damage. The brown discoloration in a support caused by the transfer of acidity to it from a more acidic support or folder is what most often constitutes major damage in this category.

g. Other - Specify other major damage by type or probable cause of damage.

ITEM 17. Loss of information.

Indicate proportion of the sample unit that has experienced an actual loss of information. For example, if the margins of all the paper have crumbled away taking the last words of each line, then all of the unit has suffered loss of information.

ITEM 18. Abundant loose dirt/dust on document.

Indicate yes if the records have loose dirt/dust that could be cleaned by treatment. Ground-in dirt/dust cannot be treated and this is not applicable to this survey. Dust is a fine powder that generally looks like a gray haze. Dirt is several times larger; distinguishing between the two is not necessary.

ITEM 19. Proportion of sample unit unused.

Record best estimate of proportion of sample unit that consists of blank pages, or similar situation.

ITEM 20. Active mold, insects, or rodants.

Note if present. This is for ~~im~~mediate action when found.

U.S. DEPT. OF COMM. BIBLIOGRAPHIC DATA SHEET (See instructions)		1. PUBLICATION OR REPORT NO. NBSIR 85-2999	2. Performing Organ. Report No.	3. Publication Date January 10, 1985
4. TITLE AND SUBTITLE National Archives and Records Service (NARS) Twenty Year Preservation Plan				
5. AUTHOR(S) Alan Calmes, Ralph Schofer, and Keith Eberhardt				
6. PERFORMING ORGANIZATION (If joint or other than NBS, see instructions) NATIONAL BUREAU OF STANDARDS DEPARTMENT OF COMMERCE WASHINGTON, D.C. 20234			7. Contract/Grant No.	8. Type of Report & Period Covered
9. SPONSORING ORGANIZATION NAME AND COMPLETE ADDRESS (Street, City, State, ZIP) National Archives & Records Center Washington, D.C. 20408				
10. SUPPLEMENTARY NOTES <input type="checkbox"/> Document describes a computer program; SF-185, FIPS Software Summary, is attached.				
11. ABSTRACT (A 200-word or less factual summary of most significant information. If document includes a significant bibliography or literature survey, mention it here) The purpose of this preservation plan is to identify types, extent of programs and resource requirements to bring the preservation needs of the National Archives and Records Service (NARS) to a current status at the end of twenty-two years. Data for developing the plan was derived from a scientific survey of holdings, data obtained from interviews with NARS' archivists, earlier studies and observation of operations. The goals are to preserve the documenting heritage of the United States and provide timely service to both government and scholarly researchers. The recommended plan is predicated upon the necessities of Preserving Documents Serving Researchers and husbanding scarce resources. The recommended plan is divided into nine action categories: 1. environmental control; 2. holdings maintenance of current holdings; 3. holdings maintenance as a part of the accessioning process; 4. interception, assessment and protection at time of use; 5. systematic duplication of impermanent documents; 6. reproduction of frequently used documents; 7. laboratory treatment of intrinsically valuable documents; 8. laboratory conservation of treasures; and 9. preservation of nontextual records. The 22 year cost of the Preservation Plan in 1984 dollars is estimated at \$209.1 million.				
12. KEY WORDS (Six to twelve entries; alphabetical order; capitalize only proper names; and separate key words by semicolons) Archival preservation; conservation; document conservation; document preservation; holdings maintenances; process engineering; stock maintenance; statistical survey; <u>systems engineering</u>				
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