

## Chapter 4: Condition of Collections

*To create a collection, to inherit one, or to be given oversight of a collection, is also to create, inherit, or accept a great responsibility. The challenge for collecting institutions is to meet the charge of stewardship and to assure that their valued collections, whether works of art, historical documents, scientific specimens, library collections, or other forms of material culture, are preserved for future generations.*

–*Position Paper on Conservation and Preservation in Collecting Institutions*, American Institute for Conservation of Historic and Artistic Works, 2002

*The Association supports the preservation of information published in all media and formats. The Association affirms that the preservation of information resources is central to libraries and librarianship.*

–*American Library Association Preservation Policy*, American Library Association, 2001

*Members of the Society for Historical Archaeology have a duty to encourage and support the long-term preservation and effective management of archaeological sites and collections...for the benefit of humanity.*

–*The Society for Historical Archaeology Ethical Principles*, The Society for Historical Archaeology, 2003

*Digital preservation is an essential aspect of all digital projects: it is imperative that the digital objects created remain accessible for as long as possible both to intended users and the wider community.*

–*The NINCH Guide to Good Practice in the Digital Representation and Management of Cultural Heritage Materials*, National Initiative for a Networked Cultural Heritage, 2002-2003

The central purpose of the Heritage Health Index is to determine the condition of U.S. collections. The survey participants, including archives, libraries, historical societies, museums, archaeological repositories, and scientific research organizations, were asked to estimate the quantity of collections for which they take preservation responsibility. Working Groups specified 58 categories of collections and organized them in 11 general categories. Respondents provided data by specific collections type, and it was aggregated into the following general categories, which were ordered in the survey questionnaire by the likelihood that institutions would have such collections:

- Books and Bound Volumes
- Unbound Sheets, cataloged in linear feet
- Unbound Sheets, cataloged in items
- Microfilm/Microfiche

- Photographic Collections
- Moving Image Collections
- Recorded Sound Collections
- Digital Materials
- Online Files
- Art Objects
- Historic Objects
- Archaeological Collections, individually cataloged
- Archaeological Collections, bulk cataloged in cubic feet
- Natural Science Specimens.

For each type of collection, survey participants were instructed to indicate the percentage of their collections in “unknown condition,”<sup>1</sup> “no need,”<sup>2</sup> “need,”<sup>3</sup> or “urgent need”<sup>4</sup> of conservation/preservation. The categories of need were intentionally broad so that every institution, even those that have not done an assessment of their collections, could easily determine condition. The

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1. Unknown condition: Material has not been recently accessed by staff for visual inspection and/or condition is unknown.  
 2. No need: Material is stable enough for use and is housed in a stable environment that protects it from long-term damage and deterioration.  
 3. Need: Material may need minor treatment or reformatting to make it stable enough for use, and/or the collection needs to be re-housed into a more stable enclosure or environment to reduce risk of damage or deterioration.  
 4. Urgent need: Material needs major treatment or reformatting to make it stable enough for use, and/or the material is located in an enclosure or environment that is causing damage or deterioration. For machine-readable collections, deterioration of media and/or obsolescence of play-back equipment or hardware/software threaten loss of content.

results of this question highlight what types of collections are in greatest need of immediate attention; however, significant percentages of each type of collections are in unknown condition, so the amount of collections in need is likely to be much higher. The subsequent chapters in this report elucidate specific needs facing collections and what institutions are doing to care for collections.<sup>5</sup>

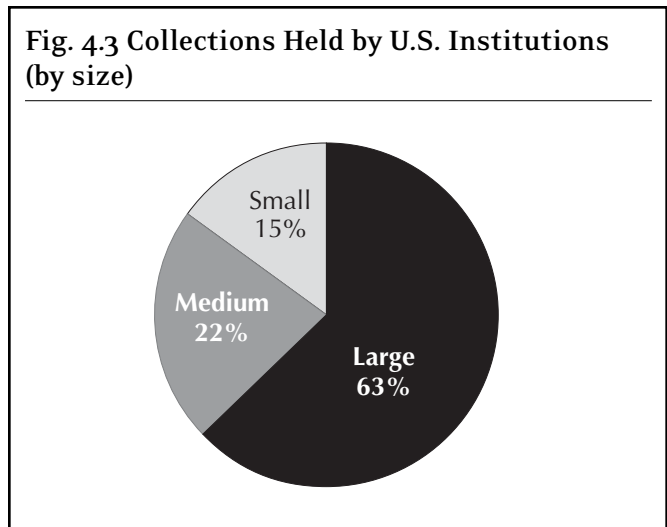
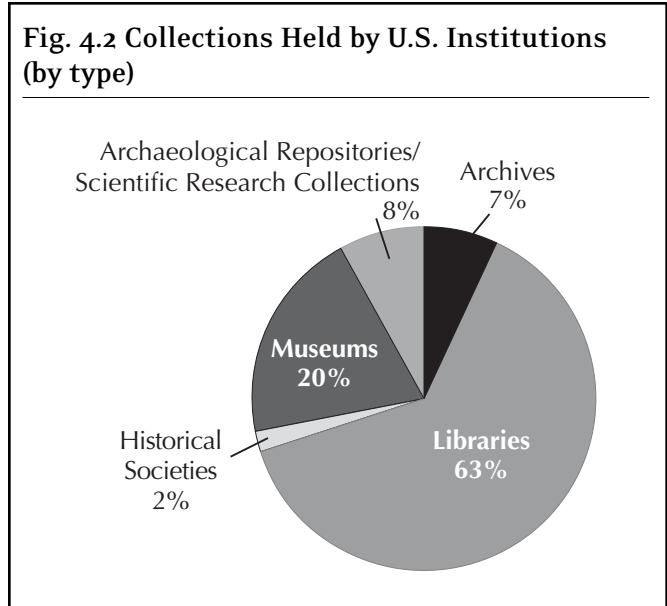
### Quantity of U.S. Collections Items

U.S. archives, libraries, historical societies, museums, archaeological repositories, and scientific research organizations care for an estimated 4.8 billion collections items (figure 4.1). Books and bound volumes account for the greatest portion of collections at 1.7 billion, followed by items of microfilm/microfiche at 1 billion. Archaeological collections cataloged in cubic feet are the lowest quantity at 2.6 million, but considering that these are measured in volume, this is a significant quantity. Digital materials on physical media such as disks or CDs are the next lowest quantity at 9 million.

Books/Bound Volumes	1.7 billion
Microfilm/Microfiche	1 billion
Natural Science Specimens	820.2 million
Photographic Collections	727.4 million
Archaeological Collections, individually cataloged	197.8 million
Unbound Sheets, cataloged in items	95.8 million
Online Files	54.6 million
Historic Objects	48.3 million
Recorded Sound	46.4 million
Unbound Sheets, cataloged in linear feet	43.6 million
Moving Images	40.2 million
Art Objects	21.2 million
Digital Materials	9 million
Archaeological Collections, cataloged in cubic feet	2.6 million

Given the extensive quantities of books and bound volumes and microfilm/microfiche, it is not surprising that libraries hold 63% of the total collections items in the U.S. (figure 4.2). Museums hold 20% of the items, followed by archaeological repositories/scientific research collections at 8%, archives at 7%, and historical societies at 2%. Figure 4.3 shows that 63% of items are held in large institutions, 22% in medium-sized institutions, and 15% in small institutions.

Institutions were instructed to complete the survey for the collections for which they take preservation responsibility. In the Frequently Asked Questions that accompanied the survey



5. Care of collections is used as a general term throughout the report and combines conservation (the treatment of materials, aided by examination and research, and the study of the environment in which they are placed) and preservation (the protection of materials through activities that minimize chemical and physical deterioration and damage and/or that prevent loss of informational content).

(Appendix F), examples of collections for which an institution may not take a preservation responsibility include non-accessioned collections such as teaching collections or replicas, or collections that could be disposed of or replaced should they become lost or damaged, such as current books, magazines, video tapes, or sound recordings. Institutions with a small amount of collections for which they take preservation responsibility, such as public libraries and children’s museums, were encouraged to complete the questionnaire so that the Heritage Health Index could truly capture the needs of all U.S. collections held in the public trust. Survey participants were instructed to include documentary evidence relating to object or scientific collections in the appropriate categories, such as archival records, photographic materials, and recorded sound materials. The questionnaire did not include any living collections or historic structures, even if they are accessioned collections. Survey participants were to include all subsidiary collections, such as an institution’s library or archives, in their collections counts.

Each type of collection was to be recorded by item except for archival documents and archaeological artifacts, which asked for quantities in unit measurements. Since archival documents are frequently measured in linear feet or cubic feet, institutions were asked to record archival records/manuscripts and maps/oversized items in these units. For the purposes of data analysis, cubic feet are converted to linear feet, with one cubic foot equal to one linear foot. Ephemera, broadsides, philatelic and numismatic artifacts, and other paper artifacts were to be recorded by item. It is not possible to aggregate the two units of measurement, so data on unbound sheets is reported by linear feet and item. Some archaeological artifacts are cataloged in bulk in cubic feet, so institutions had the option of recording archaeological artifacts by item and/or by volume. Again, it is not possible to aggregate these responses, so they are reported individually. In determining the total number of collections being cared for in the U.S., one linear foot of archival records/manuscripts or maps/oversized items and one cubic foot of bulk cataloged archaeological material is treated as one item unit. The sta-

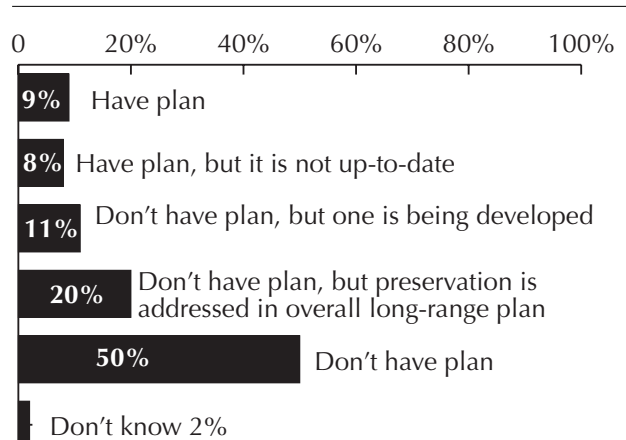
tistic that U.S. collecting institutions hold 4.8 billion artifacts would be dramatically higher if every individual item were included.

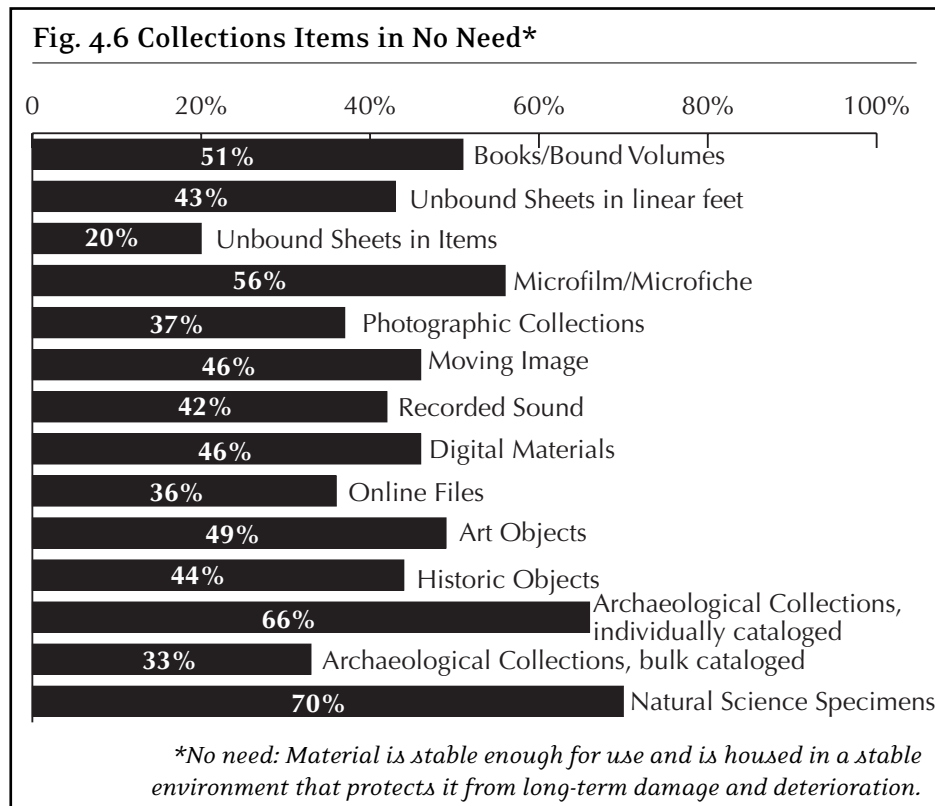
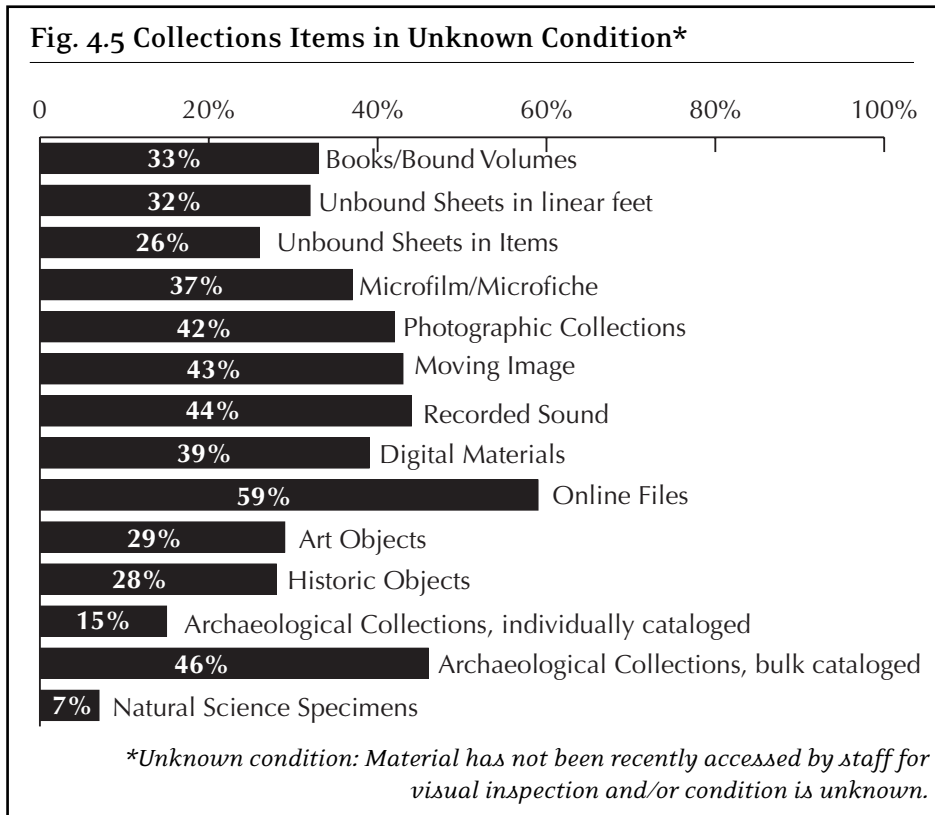
The response rates to the Heritage Health Index questions are between 97% and 100%, with the exception of preservation expenditures and funding (85%-88%) and the quantity and condition of collections. Chapter 10 discusses the lack of intellectual control and collections assessments, which explains why this information was so challenging for institutions to report in the survey. Of the institutions holding each type of collection, the response rates for quantity of collections items are:

Microfilm/Microfiche	64%
Art Objects	62%
Moving Image Collections	61%
Books and Bound Volumes	58%
Historic Objects	55%
Recorded Sound Collections	54%
Unbound Sheets, cataloged in linear feet	52%
Natural Science Specimens	50%
Photographic Collections	48%
Archaeological Collections, individually cataloged	46%
Online files	37%
Unbound Sheets, cataloged in items	36%
Archaeological Collections, bulk cataloged in cubic feet	33%
Digital Materials	31%

In the case of missing data, quantity of collections items was imputed by applying the median quantity of collections items from institutions of

**Fig. 4.4 Institutions with a Written, Long-range Plan for the Care of the Collection**





condition of collections data in context.

### Condition of U.S. Collections Items

Institutions were asked to estimate the percentage of collections items in “unknown condition,” “no need,” “need,” or “urgent need.” When viewing the results it is important to note the results to survey question D2 that half of U.S. collecting institutions do not have a long-range preservation plan for the care of collections (figure 4.4); 9% have such a plan; 8% have a plan, but it is not up-to-date; 11% have a plan in development; and 20% include collections in other institutional long-range plans. Developing a designated plan can be a first step for an institution making a commitment to changing the condition of its collections.

Of the 4.8 billion collection items in the U.S., more than 820 million are in need or urgent need; however, about 1.8 billion are in unknown condition. As seen in figure 4.5, at least one-third of most types of collections are in unknown condition. Natural science specimens (7%) and individually cataloged archaeological collections items (15%) have the lowest rates of unknown condition; online

files (59%) and bulk cataloged archaeological collections (46%) have the highest. The high number of collections items in unknown condition is significant because items that have not been

like type and size (Methodology, p. 22). The Heritage Health Index was not intended to be a census of U.S. collections; however, it was important to gather data on the number of collections to put

inspected are more likely to have suffered from neglect.

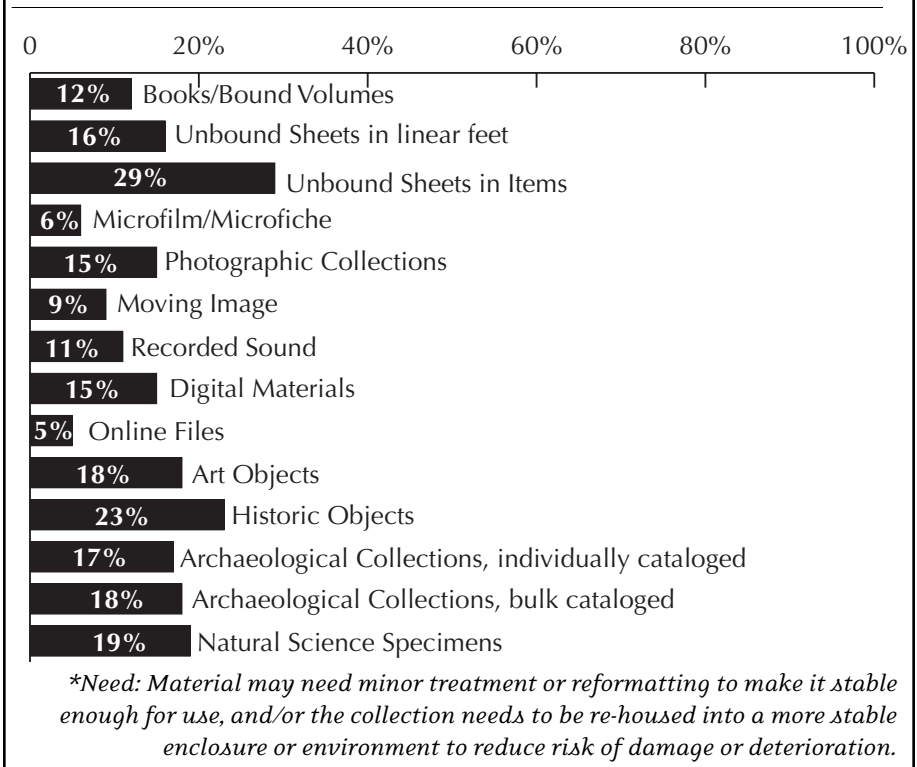
Collections items in no need vary from 70% of natural science specimens and 66% of individually cataloged archaeological collections items to 20% of unbound sheets cataloged by item and 33% of bulk cataloged archaeological collections (figure 4.6). The types of collections with the greatest percentage in no need are also the types that have the lowest percentage in unknown condition, which reinforces the accuracy of the “no need” statistic for these types of collections.

Unbound sheets cataloged by item are in the greatest need at 29%, followed by historic objects at 23% (figure 4.7). Online items (5%) and microfilm/microfiche (6%) have the lowest percentages in need. Urgent need (figure 4.8) follows a similar trend, with a quarter of unbound sheets cataloged by item and 5% of historic objects in urgent need. Eight percent of unbound sheets cataloged by linear feet are also in urgent need. Less than 1% of online files and digital materials and only 1% of microfilm/microfiche are in urgent need.

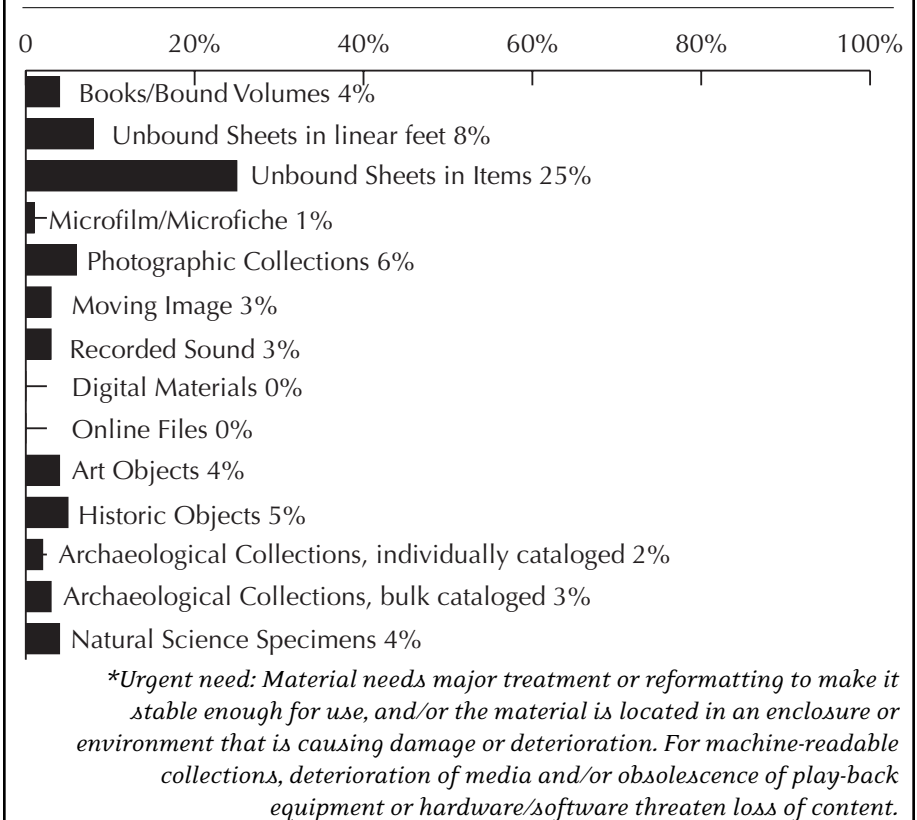
It is useful to combine the data for need and urgent need to understand the full scope of collections items in need (figure 4.9). Viewed this way, more than half of unbound sheets cataloged in items are in need, followed by 28% of historic objects, 24% of unbound sheets recorded in linear feet, and 22% of art objects. Online files (5%), microfilm/microfiche

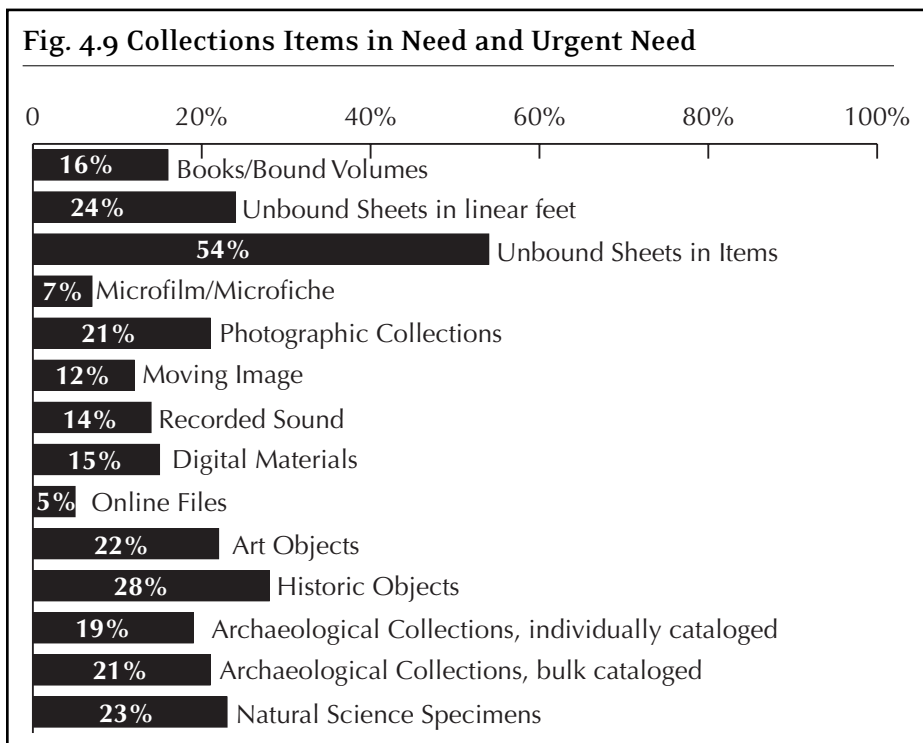
(7%), moving image collections (12%), recorded sound collections (14%), and digital materials

**Fig. 4.7 Collections Items in Need\***



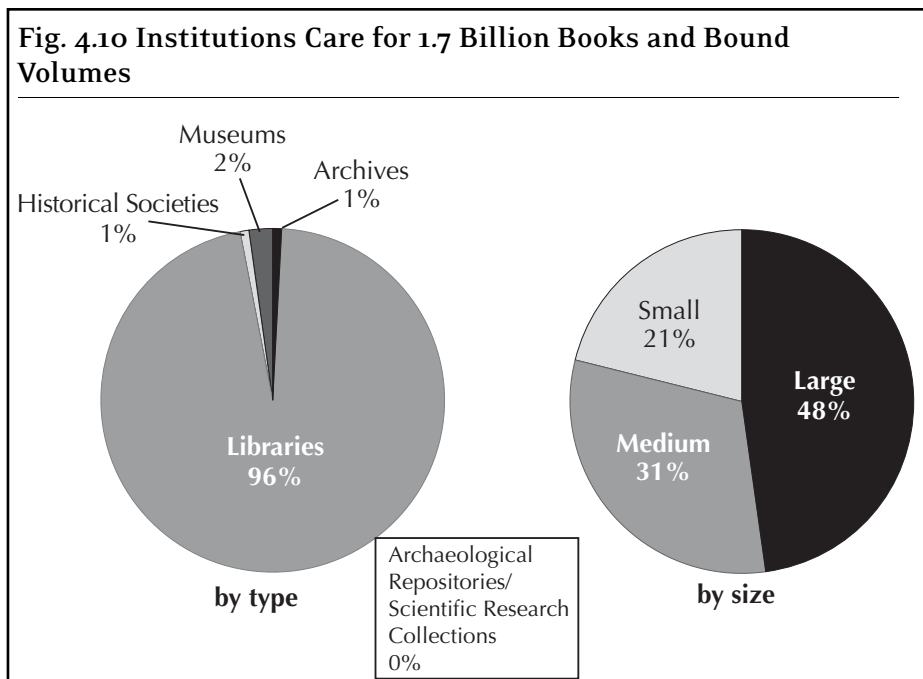
**Fig. 4.8 Collections Items in Urgent Need\***





Response rates for the condition of collections items are lower than most questions in the Heritage Health Index, but significantly higher than the response rates for quantity of collections. More discussion on unknown condition may be found in Chapter 10 on intellectual control and condition assessments. The response rates for condition are:

Microfilm/Microfiche	80%
Moving Image	
Collections	79%
Unbound Sheets, cataloged in linear feet	78%
Art Objects	78%
Recorded Sound	
Collections	77%
Photographic Collections	76%
Historic Objects	76%
Books and Bound Volumes	76%
Archaeological Collections, individually cataloged	76%
Natural Science Specimens	74%
Online files	73%
Digital Materials	70%
Archaeological Collections, bulk cataloged in cubic feet	70%
Unbound Sheets, cataloged in items	69%

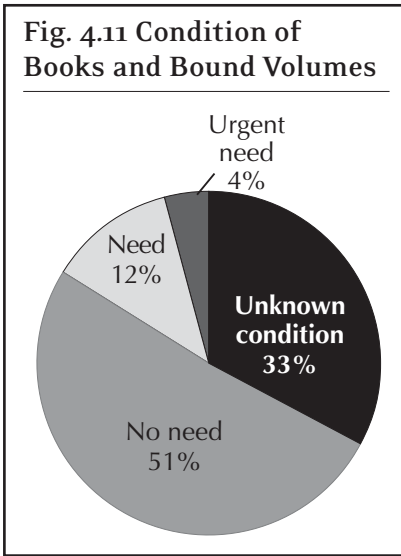


(15%) appear to be in the least need; however, one-third to more than half of these collections are in unknown condition, so the amount of collections in need could be much higher. When data for collections items in urgent need, need, and unknown condition are added together, it is clear that the condition of all types of items will require attention and resources in the decades ahead.

To compensate for missing data, condition of collections was imputed by applying the mean condition of collections items from institutions of like type and size (Methodology, p. 22).

### Books and Bound Volumes

Books and bound volumes includes books/monographs, serials/newspapers, and



**Fig. 4.12 Condition of Books and Bound Volumes (by specific type)**

	Quantity	In unknown condition	In no need	In need	In urgent need
Books and monographs	1.5 billion	33%	52%	12%	3%
Serials and newspapers	188 million	25%	54%	14%	7%
Scrapbooks, albums, pamphlets	22.3 million	40%	32%	16%	11%
Other bound volumes	5.8 million	59%	27%	11%	3%

scrapbooks/albums/pamphlets. The survey specified including only serials/newspapers on paper in this category; serials/newspapers on microfilm/microfiche were to be recorded under photographic collections.

U.S. collecting institutions have preservation responsibility for about 1.7 billion books and bound volumes (figure 4.10). Libraries hold 96% of these items, while museums hold 2%, historical societies and archives each hold 1%, and archaeological repositories/scientific research collections hold less than 1%. Books are among the most commonly held collections items, with almost 100% of libraries and historical societies holding books and 94% of archives, 88% of museums, and 70% of archaeological repositories/scientific research collections having books and bound volumes for which they take preservation responsibility. Almost half of books and bound volumes are in the care of large institutions, 31% are in medium-sized institutions, and 21% are in small institutions. By governance, state, county/municipal, and nonprofit institutions each hold approximately one-third of U.S. book and bound volume collections, with federal institutions holding 4% and tribal-governed institutions holding 1%.

One-third of books and bound volumes are in unknown condition, 51% are in no need, 12% are in need, and 4% are in urgent need (figure 4.11). Historical societies report 61% of the 21 million book collections they hold are in unknown condition, while 33% of the 1.5 billion books and bound

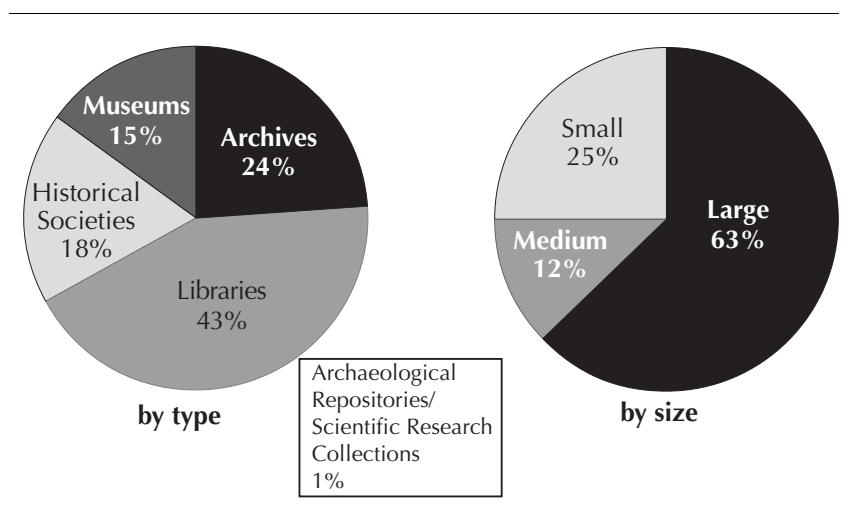
volumes in libraries are in unknown condition. Museums have 24% of their book collections in unknown condition, with archaeological repositories/scientific research collections having 20% and archives having 12%. Museums have the highest percentage of books in need at 19% and urgent need at 8%. Archives, libraries, and historical societies all have 4% of their book collection in urgent need, and archaeological repositories/scientific research collections have 2% in urgent need. Large institutions, which care for 823 million books, have the greatest number of books in unknown condition (38% compared to 28% at mid-sized and 28% at small institutions) and in urgent need (6% compared to 2% and 3%).

Figure 4.12 shows the condition of specific types of books and bound volumes. Books and monographs make up the majority of this collections category. Examples of materials that remain in “other” are musical scores, scripts, bound records, and bound manuscripts, because it is unknown whether they are books or pamphlets. Many unspecified items are also included in the other category. Scrapbooks/albums/pamphlets have the highest percentage in need and urgent need, and 40% are in unknown condition.

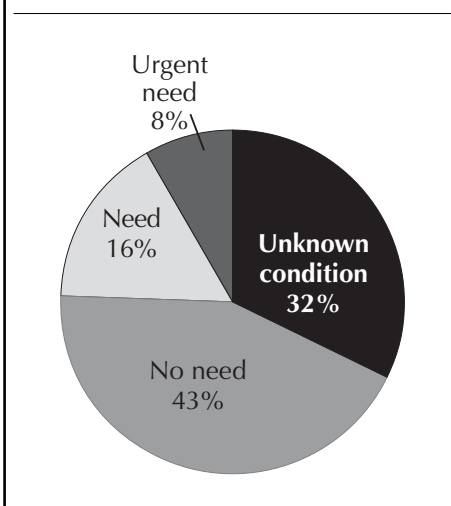
### Unbound Sheets Cataloged in Linear Feet

Unbound sheets are recorded by two measurements, linear feet and item, and each group of collections is considered separately. Archival records/manuscripts and maps/oversized items are recorded in linear feet or cubic feet. For pur-

**Fig. 4.13 Institutions Care for 44 Million Linear Feet of Unbound Sheets**



**Fig. 4.14 Condition of Unbound Sheets Measured in Linear Feet**



poses of analysis, one cubic foot is converted to one linear foot.

U.S. collecting institutions care for 44 million feet of archival records/manuscripts and maps/oversized items (more than 8,300 miles). Libraries hold 43% of these collections (about 19 million feet), archives 24%, historical societies 18%, museums 15%, and archaeological repositories/scientific research collections less than 1% (figure 4.13). Unbound sheets—whether measured in linear feet or by items—are prevalent in all types of collections: 98% of archives, 91% of historical societies, 83% of museums, 70% of libraries, and 63% of archaeological repositories/scientific research collections have these collections. Large institutions hold 63%, medium-sized institutions hold 12%, and small institutions hold 25% of unbound sheets measured in linear feet. Nonprofit institutions care for 43% of linear feet of unbound sheets, state-governed institutions 30%,

federal institutions 14%, county/municipal institutions 11%, and tribal-governed institutions 2%.

Figure 4.14 illustrates that 32% of unbound sheets by linear feet are in unknown condition, 43% are in no need, 16% are in need, and 8% are in urgent need for treatment or improved conditions. Libraries hold most of these collections and have the greatest amount in unknown condition (49%). Archives hold 11 million linear feet and have 30% in unknown condition and the highest percentage in both need (19%) and urgent need (22%). Historical societies hold 8 million linear feet of unbound sheets and have the lowest percentage in unknown condition (8%), need (10%), and urgent need (2%). Large institutions report the greatest need; of the 28 million linear feet of unbound sheets they hold, 39% are in unknown condition, 34% in no need, 17% in need, and 10% in urgent need. Tribal-governed institutions hold 2% of U.S. unbound sheets by linear

feet (1 million linear feet), but 66% are in need. Non-profit organizations—the largest holder of unbound sheets at 19 million linear feet—have 14% in need and 4% in urgent need.

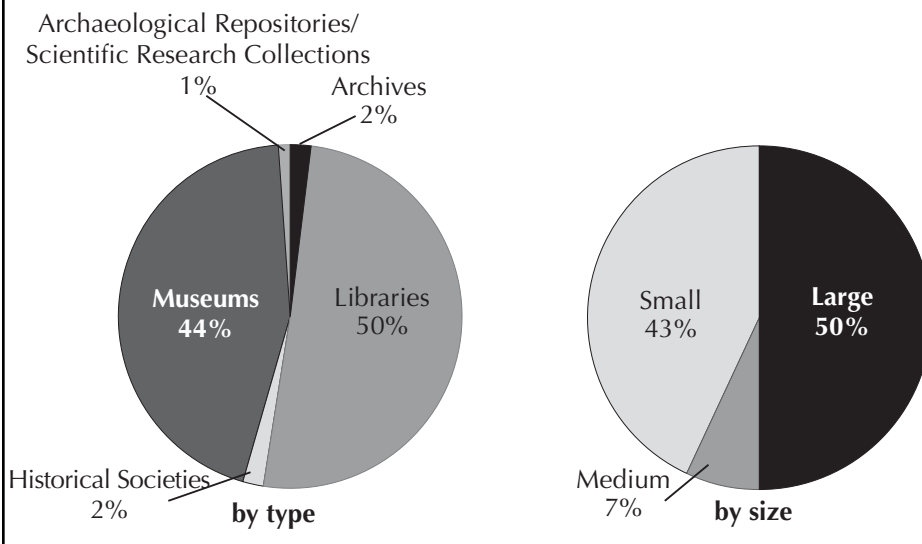
Unbound sheets measured in linear feet include about three-quarters archival records/manuscripts and one quarter maps/oversized

**Fig. 4.15 Condition of Unbound Sheets Measured in Linear Feet (by specific type)**

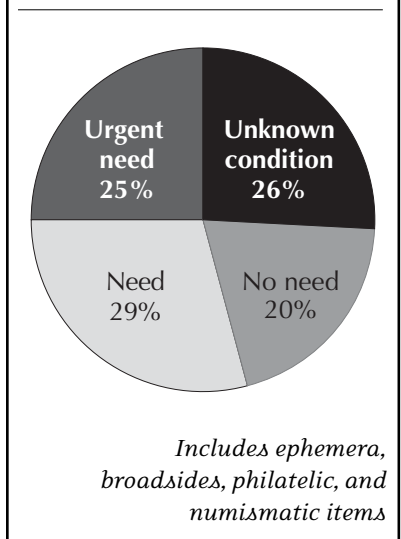
	Quantity	In unknown condition	In no need	In need	In urgent need
Archival records and manuscripts	31.4 million ft	26%	47%	17%	10%
Maps and oversized items	12.2 million ft	48%	34%	15%	3%



**Fig. 4.16 Institutions Care for 96 Million Items of Unbound Sheets**



**Fig. 4.17 Condition of Unbound Sheets in Items**



items (figure 4.15). The condition of archival records/manuscripts is more likely to be known and is in greater need (17% in need and 10% in urgent need). Again, this suggests that if the condition of maps/oversized items were known, the amount of these collections in need would be greater.

**Unbound Sheets Cataloged in Items**

The remaining unbound sheets are counted in items. These include ephemera/broadsides, philatelic/numismatic artifacts (made of paper), and other paper artifacts—96 million items in all.

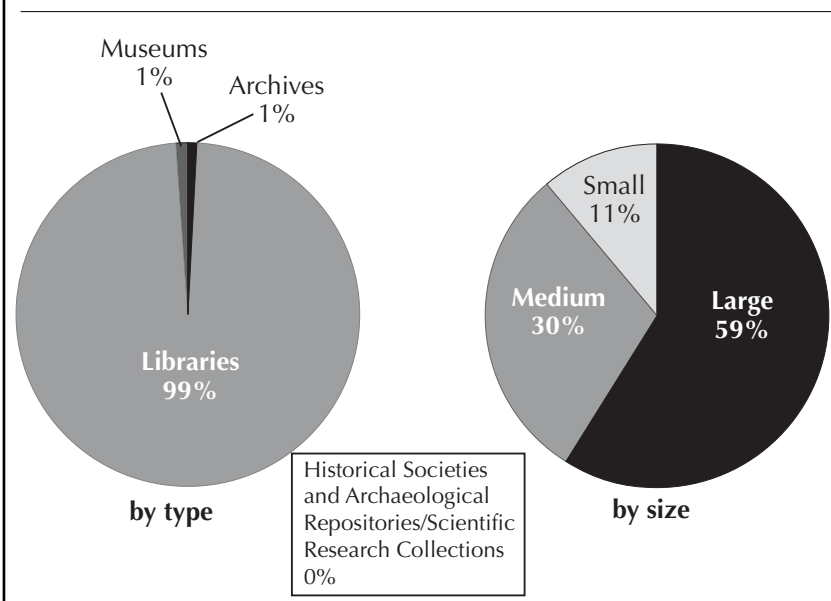
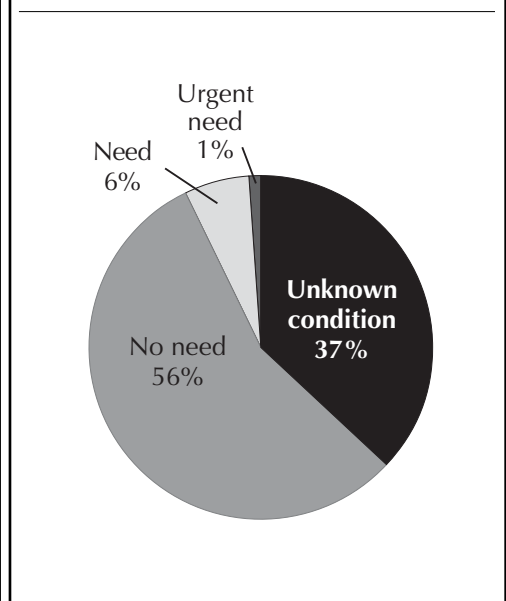
Figure 4.16 shows that 50% of unbound sheets recorded in items are held in libraries, 44% are held in museums, 2% in both archives and historical societies, and 1% in archaeological repositories/scientific research collections. Differences in the distribution of holdings between unbound sheets cataloged by linear feet and by item may be accounted for by the cataloging practices of institutions (e.g., it is a more common practice in archives to catalog in linear feet, while museums are more likely to catalog by item). Large institutions hold half of the unbound sheets (48 million items), medium-sized

institutions care for 7%, and small institutions hold 43% (41 million items). Like unbound sheets measured in linear feet, 43% of those cataloged by item are held by nonprofit organizations; federal institutions hold 36%, state institutions hold 16%, county/municipal institutions hold 4%, and tribal institutions hold 1%.

Twenty-six percent of unbound sheets cataloged by items are in unknown condition, 20% are in no need, 29% are in need, and 25% are in urgent need (figure 4.17). Of all types of collections, this collections category has the highest percentage in urgent need at 25% (figure 4.8) and need and urgent need at 54% (figure 4.9). Museums account for a large part of this percentage, because they hold 44% of total collections and have 25% in need and 35% in urgent need. Libraries, which hold 48 million items or half of

**Fig. 4.18 Condition of Unbound Sheets in Items (by specific type)**

	Quantity	In unknown condition	In no need	In need	In urgent need
Ephemera and broadsides	22 million	24%	28%	22%	25%
Philatelic and numismatic artifacts	18.1 million	24%	15%	32%	29%
Other unbound sheets	55.7 million	28%	19%	31%	23%

**Fig. 4.19 Institutions Care for 1 Billion Microfilm and Microfiche****Fig. 4.20 Condition of Microfilm and Microfiche**

total U.S. holdings of unbound sheets cataloged by item, have 18% in urgent need and 34% in need. The figures are also influenced by size of institution, with small institutions holding 43% of items and having 41% in urgent need and 32% in need. Large institutions hold half of these collections; 14% are in urgent need and 27% are in need. By governance, federal institutions have the largest percentage of items of unbound sheets in urgent need (42%) and need (26%), followed by nonprofit institutions with 19% in urgent need and 35% in need.

Viewed by specific type of unbound sheets (figure 4.18), about 23% are ephemera/broadsides, 19% are philatelic/numismatic artifacts, and the remaining 58% are other unbound sheets by item. The “other” category mainly includes items that are not recorded in linear feet, such as architectural drawings, blueprints, and sheet music. The three specific types are about equal in the percentages in unknown condition, no need, need, and urgent need.

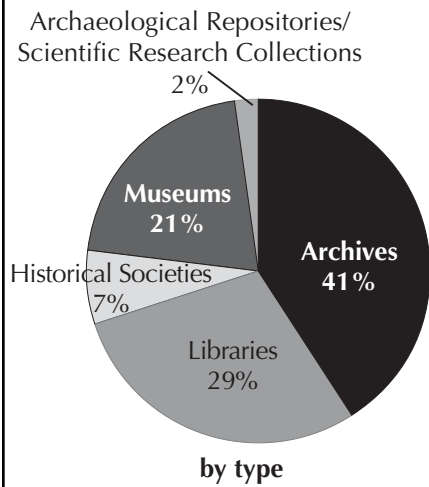
### Microfilm/Microfiche

Since microfilm/microfiche accounts for 58% of all photographic collections items and differs in condition, it is considered separately from other photographic collections. U.S. collecting institutions care for 1 billion items of microfilm/microfiche. Microfilming is a method for

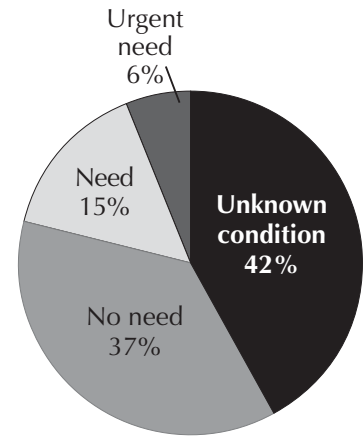
preserving content of paper artifacts, so these items constitute an important collection (in survey question D10, one-third of institutions report their staff is involved in preservation reformatting, which includes microfilming, and 16% of institutions contract with external providers for preservation reformatting). Almost all microfilm/microfiche is held by libraries (99%), with archives and museums both holding 1%, and historical societies and archaeological repositories/scientific research collections having less than 1% (figure 4.19). Large institutions hold 59% of microfilm/microfiche; medium-sized institutions hold 30%; and small institutions hold 11%. Almost 60% are held by state-governed institutions, 19% by nonprofit institutions, 13% by county/municipal institutions, 4% by federal institutions, and 1% by tribal institutions.

Figure 4.20 shows the condition of microfilm/microfiche: 37% in unknown condition, 56% in no need, 6% in need, 1% in urgent need. Museums recorded 77% (about 4.9 million items) of microfilm/microfiche in unknown condition, so it is not surprising that only 1% are in need and less than 1% are in urgent need. Archives, libraries, and historical societies all have about 35% in unknown condition and between 7% and 13% in need and urgent need. By size, large institutions have the most in unknown condition at 46% and most in need and urgent need at 11%.

**Fig. 4.21 Institutions Care for 727 Million Photographic Items**



**Fig. 4.22 Condition of Photographic Items**



**Photographic Collections**

Photograph formats are organized by media that have similar preservation needs. Black and white negatives are further divided into “pre-1950” and “post-1950” because cellulose nitrate and cellulose acetate—highly unstable photographic mediums—were more commonly used in the late nineteenth century and first half of the twentieth century, while the comparatively more stable films such as polyester have been more common since 1950. Formats include: black and white prints; black and white film negatives, pre-1950; black and white film negatives, post-1950; color prints/negatives/positives; cased objects (such as daguerreotypes, ambrotypes, tintypes); glass plate negatives/lantern slides; and other photographic collections.

There are 727 million photographic items being cared for by U.S. collecting institutions. Archives care for 41% or almost 300 million photographic items; libraries hold 29%, museums hold 21%, historical societies hold 7%, and archaeological repositories/scientific research collec-

tions hold 2% (figure 4.21). Photographic collections, including microfilm/microfiche, are common in all U.S. collecting institutions: 96% of archives, 93% of historical societies, 90% of museums, 71% of libraries, and 62% of archaeological repositories/scientific research collections have photographic items in their collections. Large institutions take preservation responsibility for about three-quarters of photo-

**Fig. 4.23 Condition of Photographic Items (by specific type)**

	Quantity	In unknown condition	In no need	In need	In urgent need
Microfilm and Microfiche	1 billion	37%	56%	6%	1%
Black and white prints	251.5 million	33%	44%	19%	5%
Black and white negatives (pre-1950)	57 million	27%	38%	26%	9%
Black and white negatives (post-1950)	123.8 million	23%	47%	17%	13%
Color prints, negatives, and positives	67.5 million	24%	48%	25%	3%
Cased objects	0.7 million	47%	28%	21%	4%
Glass plate negatives and lantern slides	9.7 million	34%	40%	21%	5%
Other photographs	194 million	73%	21%	2%	3%

graphic materials in the U.S., while medium-sized institutions care for 13%, and small institutions care for 11%. About a third of photographic collections are held in nonprofit institutions, and another third are held in state-governed institutions; almost one quarter is held by federal institutions.

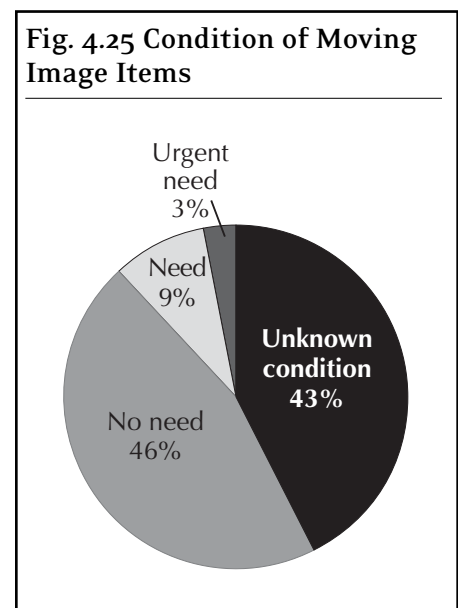
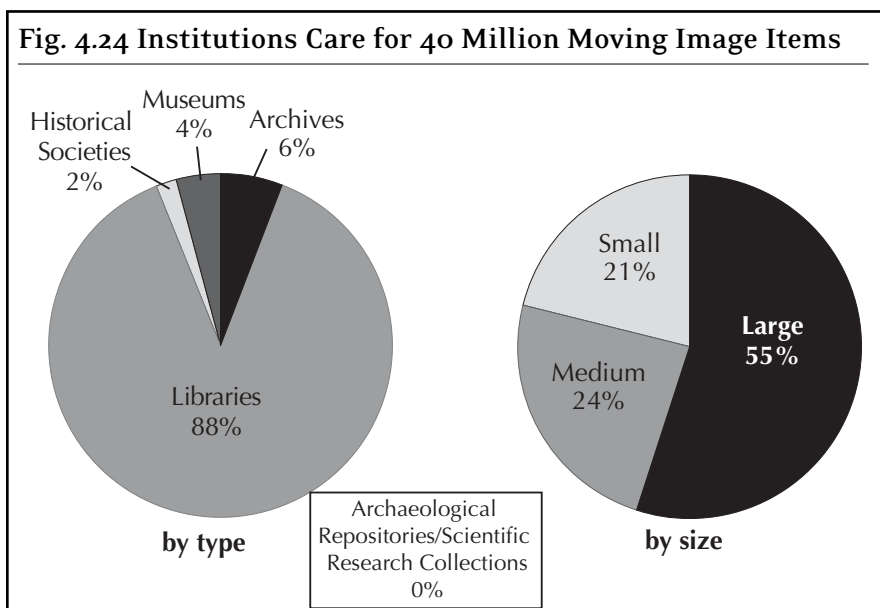
More than 40% of photographic collections are in unknown condition (figure 4.22), 37% are in no need, 15% are in need, and 6% are in urgent need. At archives, 56% of photographs are in unknown condition, while at historical societies the figure is 50%. Almost 40% of photographs in libraries, 21% in museums, and 14% in archaeological repositories/scientific research collections are in unknown condition. By type of institution, almost all have close to 20% of their photographic collections in need (with the exception of archives, which have 6% in need) and about 5% in urgent need. Viewed by size of institution, large institutions, which hold the greatest number of photographic items, have the highest percentage in unknown condition at 46%, need at 9%, and urgent need at 2%. The data by governance does not vary significantly from the national average, except for tribal-governed institutions, which have 10% in unknown condition, 76% in no need, 12% in need, and 1% in urgent need.

Figure 4.23 shows the data on photographic materials by specific type. The quantities will not add to the total of 727 million items because some institutions were not able to report by spe-

cific category and instead reported total photographic material holdings. Institutions were instructed to include digital and inkjet prints in the “other” category, and these items account for a large portion of collections in this category. Some institutions reported digital photographs in this category and, since they did not indicate what media the digital photographs are stored on, it is not possible to move their responses to the digital material category where they should have been recorded. Therefore, these are included in “other photographic collections” as well. Black and white prints account for the greatest number of photographic items, after microfilm/microfiche. There are more than 57 million black and white negatives created before 1950, which includes some on highly unstable photographic materials; some of it (cellulose nitrate) is flammable if not stored in the proper conditions. Nine percent are in urgent need and, most significantly, 27% are in unknown condition. Black and white negatives, post-1950, have the greatest urgent need at 13%, and almost half of cased objects are in unknown condition.

### Moving Image Collections

Moving image collections include motion picture film, magnetic tape (e.g., Beta video, VHS video, digital), disk (e.g., laser, CD, DVD, mini-disk), and other moving image collections. The quantity of moving image collections can be recorded in various ways—for example, in feet of



**Fig. 4.26 Condition of Moving Image Items (by specific type)**

	Quantity	In unknown condition	In no need	In need	In urgent need
Motion picture film	5.9 million	40%	32%	19%	9%
Magnetic tape	23 million	41%	49%	8%	2%
Disk	10.7 million	47%	49%	3%	1%
Other moving image items	0.3 million	89%	9%	1%	0%

film. Moving Images and Recorded Sound Working Group members discussed the best way to quantify these media and decided that for the ease of the majority of respondents, most types of collections should be counted by item, such as reels or tapes.

There are 40 million moving image items being cared for in the U.S. Figure 4.24 shows that 88% are in the care of libraries, 6% are in archives, 4% in museums, 2% in historical societies, and less than 1% in archaeological repositories/scientific research collections. Moving image collections are in 86% of archives, 78% of libraries, 63% of historical societies, 52% of museums, and 30% of archaeological repositories/scientific research collections. Large institutions hold 55% of moving image collections, while 24% reside in mid-sized institutions and 21% are held by small institutions. More than half (57%) are held by institu-

tions under county/municipal governance and 19% by state, 17% by nonprofit, 7% by federal, and 1% by tribal-governed institutions.

The condition of moving image collections includes 43% in unknown condition, 46% in no need, 9% in need, and 3% in urgent need (figure 4.25). Viewed by type of institution, libraries, which hold the majority of moving image

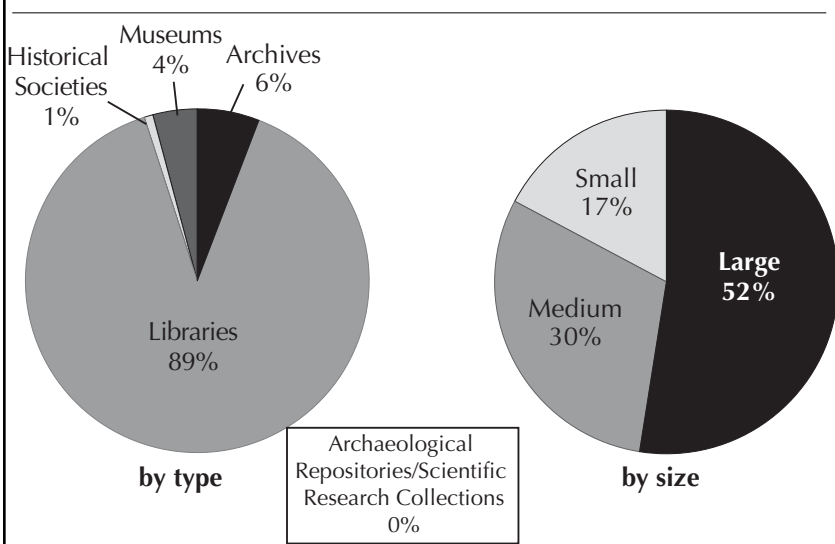
collections (almost 36 million items), cite that 45% are in unknown condition. Museums claim the greatest need (22%) and urgent need (11%). By size, large institutions—dominated by libraries—have 51% of moving image collections in unknown condition, 8% in need, and 3% in urgent need. The results from libraries also explain the high percentage of moving images held by county/municipal governed institutions. County/ municipal institutions have 44% in unknown condition, 6% in need, and 2% in urgent need.

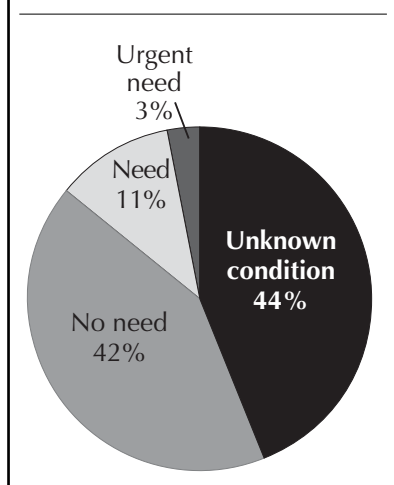
Heritage Health Index survey question D10 asked what is included in institutions' preservation programs, and only 23% of institutions indicated they are involved in the preservation of audio-visual media and play-back equipment. This would include making preservation copies of materials and maintaining equipment without

which older formats of moving image and recorded sound collections could not be accessed. At 8% of institutions, preservation of audio-visual media is done by an external provider. Most significantly, at 46% of institutions, no such preservation activities are taking place. (Respondents also had the option of selecting not applicable; 25% did so.)

Figure 4.26 shows the quantity and condition of specific types of moving image collections. While magnetic tape is more prevalent, accounting for 58% of all moving image items, film is in the greatest

**Fig. 4.27 Institutions Care for 46 Million Recorded Sound Items**



**Fig. 4.28 Condition of Recorded Sound Items**

need, with almost one-fifth in need and 9% in urgent need. Other moving image collections include film loops, filmstrips, film slides, and unspecified collections.

### Recorded Sound Collections

Recorded sound collections include grooved media (e.g., cylinder, phonodisk), magnetic media (e.g., cassette, open reel tape, DAT), optical media (e.g., CD, DVD), digital media (e.g., MP3s), and other recorded sound collections. All collections are counted by item.

U.S. collecting institutions have taken a responsibility to preserve 46 million recorded sound collections items. The distribution of these collections is similar to that of moving image collections. Most recorded sound items are held by libraries (89%), with the remaining held by archives (6%), museums (4%), historical societies (1%), and archaeological repositories/scientific research collections (less than 1%) (figure 4.27). Recorded sound collections are in 84% of archives, 76% of libraries, 64% of historical societies, 50% of museums, and 26% of archaeological repositories/scientific research collections. Large institutions hold 52%; medium-sized institutions hold 30%; and small institutions have 17%. Slightly more than a third are held by state and county/municipal institutions, 20% by non-profit institutions, 8% by federal institutions, and less than 1% by tribal-governed institutions.

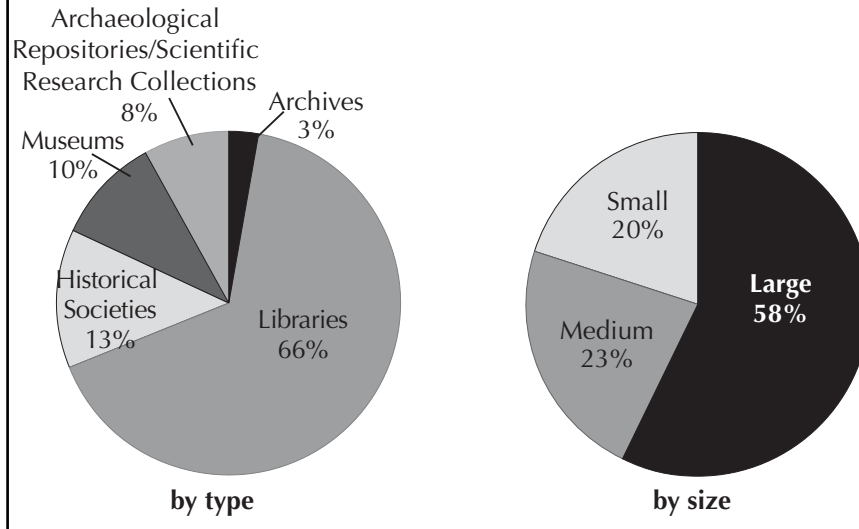
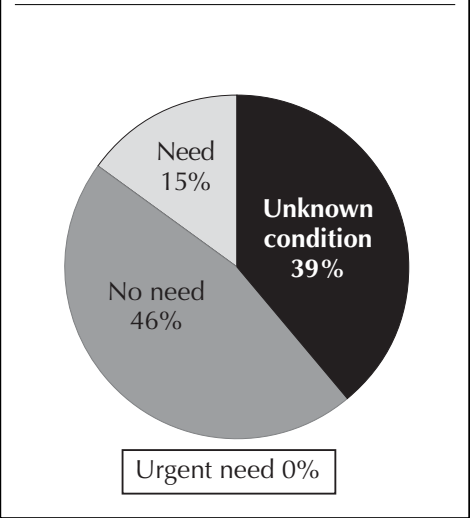
The condition is not known for 44% of recorded sound items—more than 20 million items (fig-

**Fig. 4.29 Condition of Recorded Sound Items (by specific type)**

	Quantity	In unknown condition	In no need	In need	In urgent need
Grooved media	9.6 million	59%	23%	13%	6%
Magnetic media	21.5 million	30%	52%	16%	2%
Optical media	12.4 million	52%	43%	2%	3%
Digital media	0.4 million	61%	36%	3%	0%
Other recorded sound items	0.2 million	74%	8%	15%	3%

ure 4.28). Forty-two percent are in no need, 11% are in need, and 3% are in urgent need. When viewed by institutional type, libraries and historical societies both have about 46% in unknown condition, while archives and museums have about 30%. Archives have the greatest percentage in need at 43%, followed by museums and archaeological repositories/scientific research collections, both at 24%. Museums have the most recorded sound collections in urgent need at 9%. Large institutions lead in having recorded sound items in unknown condition (55%), but small institutions do not know the condition of 41% of their recorded sound collections. Small institutions cite the greatest needs for recorded sound, with 17% in need and 4% in urgent need. By governance, conditions are relatively close to the national average, with the exception of federal institutions, which have 23% of recorded sound in need and 15% in urgent need, and tribal-governed institutions, which have 83% of their collections in unknown condition.

Recorded sound is divided by specific type of collections in figure 4.29. The quantities total slightly less than 46 million items because some institutions could only report totals for their collections. Magnetic media accounts for the largest portion of recorded sound, has the most condition known, and has one of the highest percentages in need at 18% (16% need, 2% urgent need). Grooved and digital media are the most likely to be in unknown condition. Institutions were instructed to include wire and dictabelts in the

**Fig. 4.30 Institutions Care for 9 Million Digital Material Items****Fig. 4.31 Condition of Digital Material Items**

“other recorded sound collections,” and these formats dominate the count in the category. “Other” also includes music box disks and player piano rolls.

### Digital Materials

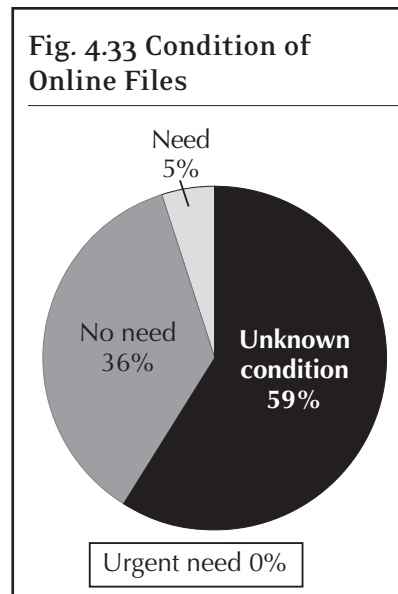
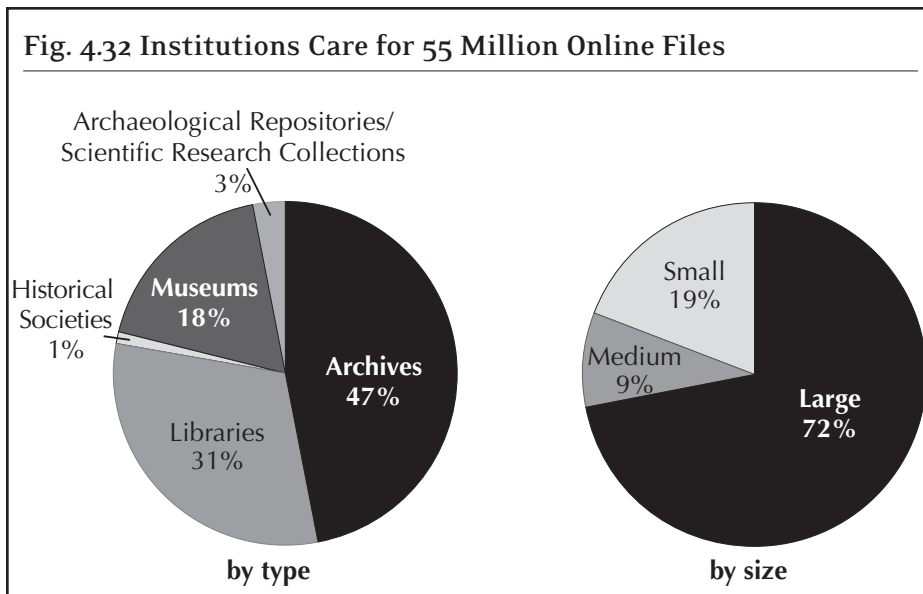
The Heritage Health Index is the first survey to document the condition of digital collections at all institutions that hold them; this is particularly significant in the case of digital materials, because they are increasingly larger portions of collecting institutions’ holdings and pose new, unique preservation challenges. Digital materials include floppy disks, other disks, CD-R/DVD-R, data tape, online collections (to be recorded in files), and other digital collections. The survey’s Frequently Asked Questions asked survey respondents to carefully consider whether digital or digitized materials are items they take a preservation responsibility to maintain. For example, it was recommended that most electronic material made available at an institution through a subscription not be recorded in the survey, unless the institution maintains the master digital files for the resource.

While digital materials could have been quantified in bytes of information, Working Group members concluded it would be easiest for most institutions to count digital materials by item. Counts of physical items, such as floppy disks or CDs, are easily understood, whereas counts of online files are more complex. An online file

could have one piece of information or thousands of bytes of information in it. To get a better understanding of the condition of physical items that hold digital information, online files are considered separately from digital material on physical formats.

U.S. institutions have taken preservation responsibility for 9 million physical items that store digital materials. Two-thirds reside in libraries, 13% in historical societies, 10% in museums, 8% in archaeological repositories/scientific research collections, and 3% in archives (figure 4.30). Including online files, digital materials are in 73% of archives, 58% of libraries, 55% of archaeological repositories/scientific research collections, 44% of historical societies, and 43% of museums. Large institutions care for 58% of digital materials; the remaining are at mid-sized institutions (23%) and small institutions (20%). About half of digital materials are held by state institutions (48%), 30% by county/municipal, 18% by nonprofit, 3% by federal, and 1% by tribal-governed institutions.

The condition of digital material items is illustrated in figure 4.31; 39% are in unknown condition, 46% are in no need, 15% are in need, and less than 1% are in urgent need. The percentage in unknown condition ranges from 3% at historical societies to 50% at libraries. The percentage in need also covers a broad range, with 86% in need at historical societies and 2% in need at libraries. Perhaps if libraries knew the condition



of more of their digital materials they, like historical societies, might have a greater percentage in need. At large institutions, 52% of digital materials are in unknown condition, 25% are in no need, 23% are in need, and less than 1% are in urgent need. At medium-sized institutions, those figures are 19% in unknown condition, 79% in no need, 3% in need, and less than 1% in urgent need. At small institutions, 26% of digital materials are in unknown condition, 69% are in no need, 5% are in need, and less than 1% are in urgent need. State institutions cite one-third of digital materials in unknown condition and 24% in need. At county/municipal institutions, 43% are in unknown condition and only 1% are in need.

Considering online collections, U.S. institutions have taken preservation responsibility for 55 million files. Archives

hold 47%, libraries 31%, museums 18%, archaeological repositories/scientific research collections 3%, and historical societies 1% (figure 4.32). Nearly three-quarters are in large institutions, 9% in medium-sized institutions, and 19% in small institutions. About 40% are held by federal institutions, while nonprofit and state institutions each have about a quarter.

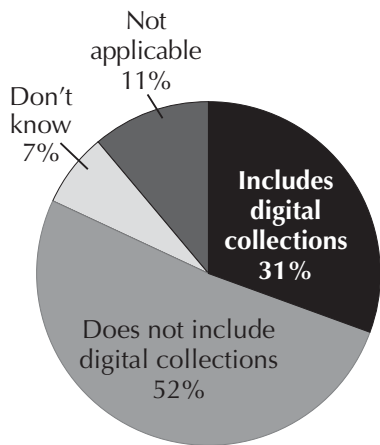
The condition of online files includes 59% in unknown condition, 36% in no need, 5% in need, and less than 1% in urgent need (figure 4.33). Archives, which hold the greatest number of online files (almost 26 million), have 84% of collections in unknown condition. Libraries, the second largest holders of online files, have 48% in unknown condition. Like physical digital materials, there is a range in condition; archaeological repositories/scientific research collections have the lowest percentage in unknown condition (3%) and the greatest percentage in need (64%), while archives have the highest percentage in unknown condition (84%) and one of the lowest percentages in need (2%). Large institutions have 71% of online collections in unknown condition, 26% in no need, 2% in need, and less than 1% in urgent

**Fig. 4.34 Condition of Digital Materials (by specific type)**

	Quantity	In unknown condition	In no need	In need	In urgent need
Floppy disks	0.6 million	62%	30%	6%	2%
Other disks	1.6 million	91%	7%	1%	0%
CD-R/DVD-R	2 million	46%	50%	4%	0%
Data tape	0.2 million	44%	40%	15%	1%
Online collections (by files)	54.6 million	59%	36%	5%	0%
Other digital material	1.4 million	16%	76%	8%	0%



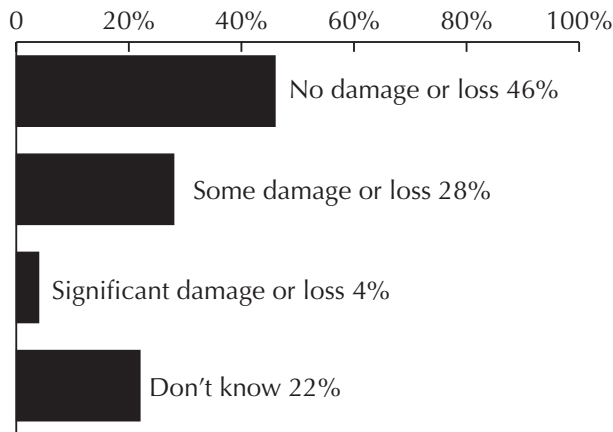
**Fig. 4.35 Institutions That Include Responsibility to Preserve Digital Collections in Conservation/ Preservation Missions or Programs**



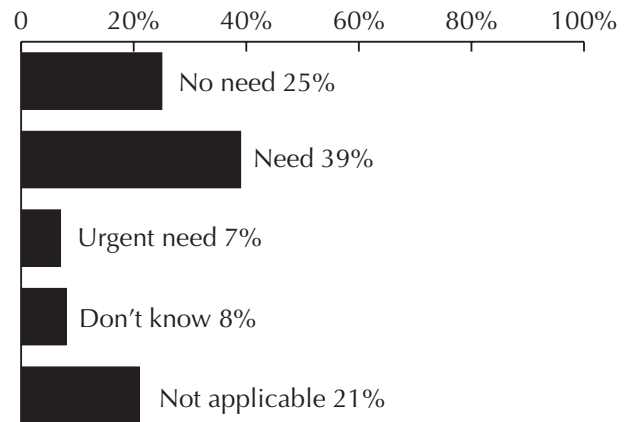
need. At mid-sized institutions these figures are 22%, 53%, 25%, and less than 1%; at small institutions they are 27% in unknown condition, 69% in no need, 3% in need, and less than 1% in urgent need.

Figure 4.34 shows results by specific types of digital materials. Online files account for the largest number of these materials, but of physical formats, CD-R/DVD-R is the most prevalent. Data tape has the greatest need at 16%. Some institutions could only provide total quantities of digital

**Fig. 4.37 Institutions with Collections Currently in Need of Treatment Due to Obsolescence of Play-back Equipment, Hardware, or Software**



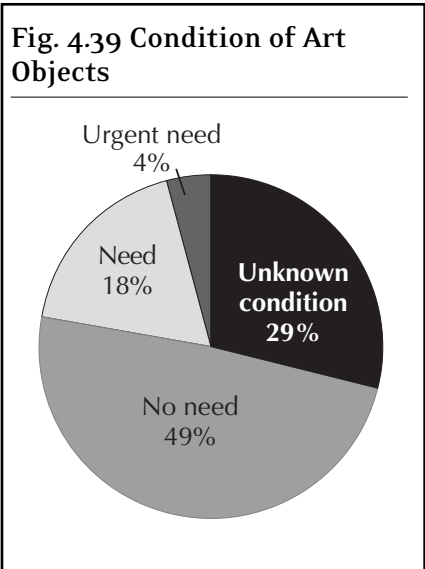
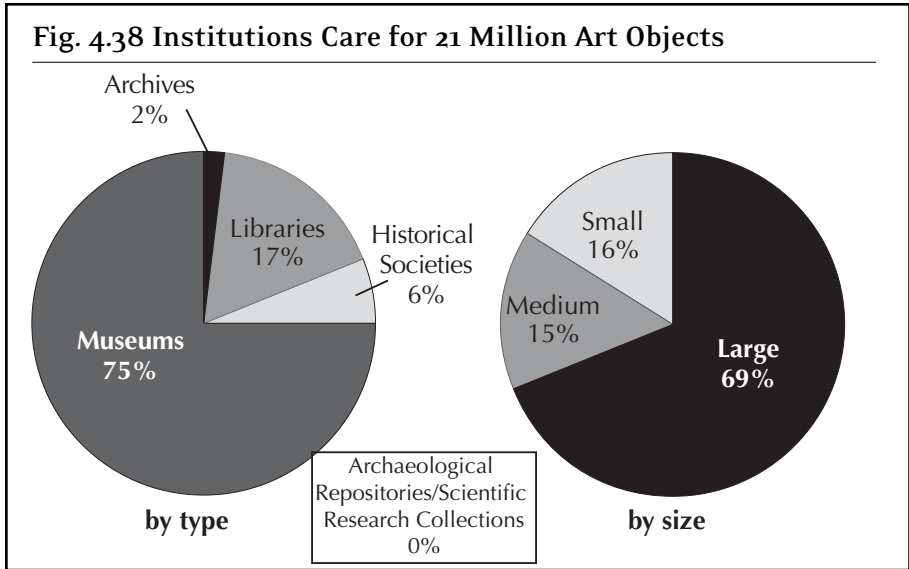
**Fig. 4.36 Need for Preservation of Digital Collections**



materials, so specific categories of digital materials will not total 9 million. Other digital collections include databases, e-books, and files specified by content rather than the media on which that content is held.

Because digital is a relatively new format, the Electronic Records and Digital Collections Working Group did not expect to find many institutions engaged in the preservation of digital materials. However, they recommended that the Heritage Health Index gauge how many institutions have recognized that digital materials should be part of their preservation programs. Survey question D11 asked, “Does your institution’s conservation/preservation mission or program include the responsibility to preserve digital collections?”<sup>6</sup> The responses, shown in Figure 4.35, include 31% of institutions responding they do, 52% do not, and 7% don’t know; 11% stated it is not applicable for their institution. Archives (52%) and archaeological repositories/ scientific research collections (49%) are more likely to include digital materials in their preservation programs or missions than libraries (23%), historical societies (33%), and museums (36%). Digital materials are included in 47% of large institutions’ preservation missions or programs, compared to 37% for medium-sized institutions and 28% for small institutions.

6. Digital collections are defined as computer-based representations of text, numbers, images, and/or sound, e.g., optical disks, Web sites, electronic books.



Survey question D10 asked whether institutions are involved in the preservation of digital materials and electronic records, and 27% of institutions have staff involved in digital preservation, such as migrating data to current software, while 6% have external providers doing such activities. Additional questions on digital preservation asked institutions about the need to preserve digital collections (figure 4.36); 46% cited a need. Digital preservation was a topic in question D13, which asked about causes of damage. The question asked if access to collections has been lost due to obsolescence of play-back equipment, hardware, or software. The results apply to all machine-readable formats, including motion picture, recorded sound, and digital materials. While 46% of institutions have experienced no loss, 28% have had some damage, 4% have had significant damage, and 22% of institutions don't know—one of the highest “don't know” figures for this question (figure 4.37).

**Art Objects**

Art objects include paintings (e.g., on canvas, panel, plaster), art on paper (e.g., prints, drawings, watercolors), sculptures (including carvings, indoor and outdoor sculptures in all media), decorative arts (e.g., fine metalwork, jewelry, timepieces,

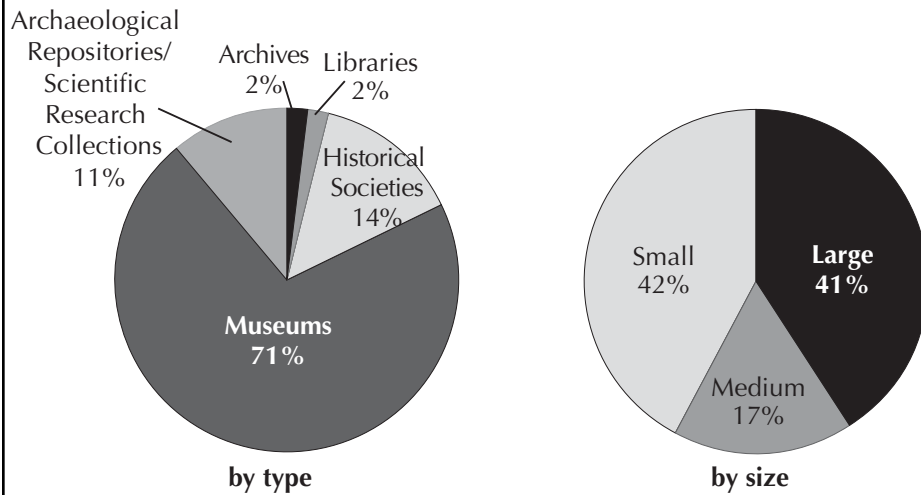
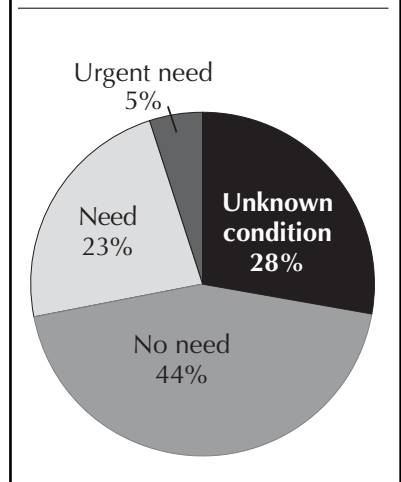
enamels, ivories, lacquer), and other art objects.

U.S. collecting institutions care for 21 million art objects. Most are held by museums (75%), while libraries hold 17%, historical societies 6%, archives 2%, and archaeological repositories/scientific research collections less than 1% (figure 4.38). Eighty-six percent of museums have art objects in their collections, as do 83% of historical societies, 74% of archives, 44% of libraries, and 33% archaeological repositories/scientific research collections. Large institutions hold nearly 70% of art objects, followed by 16% at small institutions and 15% at medium-sized institutions. More than half of art object collections are in nonprofit organizations (54%); 30% are in state organizations; and the remaining amounts are split between federal (7%) and county/municipal institutions (8%). Tribal-governed institutions account for less than 1% of art object holdings.

Figure 4.39 shows that 29% of art objects are in unknown condition, 49% are in no need, 18%

**Fig. 4.40 Condition of Art Objects (by specific type)**

	Quantity	In unknown condition	In no need	In need	In urgent need
Paintings	1.5 million	22%	49%	23%	7%
Art on paper	12.4 million	29%	48%	19%	4%
Sculptures	0.7 million	20%	55%	23%	3%
Decorative arts	3.1 million	38%	42%	16%	4%
Other art objects	1.4 million	28%	58%	13%	1%

**Fig. 4.41 Institutions Care for 48 Million Historic and Ethnographic Objects****Fig. 4.42 Condition of Historic and Ethnographic Objects**

are in need, and 4% are in urgent need. Archives have the greatest percentage in unknown condition at 56%, followed by historical societies at 45%. Museums, libraries, and archaeological repositories/scientific research collections have close to the national average of 29% in unknown condition. Archaeological repositories/scientific research collections have the highest percentage in urgent need at 11%. Archives have the least in need with 13% in need and 2% in urgent need, while the remaining types of institutions are close to the average of 18% in need and 4% in urgent need. Small institutions do not know the condition of 36% of art objects (more than at institutions of other sizes) and also have the most in need at 20% in need and 7% in urgent need. Large institutions, which hold almost 15 million art objects, have 30% in unknown condition, 17% in need, and 3% in urgent need.

Viewed by specific types of collections (figure 4.40), art on paper represents the largest portion of art objects but paintings are in the greatest need. The total of specific types is under 21 million objects because some institutions could only report total holdings. Other art objects include artists' materials, such as woodblocks or other print plates, and mixed media such as collage or folk art.

### Historic and Ethnographic Objects

Creating a list of artifacts to include in this category was a great challenge. In other cate-

gories, collections of like media are grouped together. However, many historic collections are arranged thematically, making it difficult for institutions to separate out specific types such as wooden objects or metal objects. The Working Group on Furniture, Textiles, and Historic Objects settled on a mixed approach of media and subject matter. The specific types for historic and ethnographic objects include textiles (including flags, rugs, costumes, and accessories); ceramics and glass artifacts (including stained glass); ethnographic and organic collections (e.g., leather, skin, baskets, bark); metalwork (e.g., arms and armor, medals, coins); furniture; domestic artifacts (including frames, household tools/machines, dolls/toys, musical instruments); science, technology, agricultural, and medical artifacts (including transportation artifacts); and other historic and ethnographic objects.

U.S. collecting institutions care for 48 million historic and ethnographic objects, with 71% at museums, 14% at historical societies, 11% at archaeological repositories/scientific research collections, and 2% at both archives and libraries (figure 4.41). Historic and ethnographic objects are in 95% of historical societies, 90% of museums, 73% of archives, 35% of archaeological repositories/scientific research collections, and 33% of libraries. Small institutions hold 42% of historic and ethnographic objects (20 million items), while large institutions hold 41% and medium-sized hold the remaining 17%. Nonprofit

**Fig. 4.43 Condition of Historic and Ethnographic Objects (by specific type)**

	Quantity	In unknown condition	In no need	In need	In urgent need
Textiles	9.5 million	26%	39%	30%	5%
Ceramics and glass artifacts	10.8 million	21%	55%	22%	2%
Ethnographic and organic collections	6.8 million	23%	40%	27%	9%
Metalwork	3.2 million	35%	45%	17%	4%
Furniture	1.6 million	27%	41%	26%	6%
Domestic artifacts	7.1 million	29%	44%	21%	6%
Science, technology, agricultural, medical artifacts	4.7 million	28%	45%	23%	5%
Other historic and ethnographic objects	3.3 million	44%	35%	16%	5%

dition, 36% in no need, 24% in need, and 6% in urgent need. Large institutions have 25% in unknown condition, 47% in no need, 24% in need, and 4% in urgent need. Results by governance are close to the national average, except tribal-governed institutions, which have 59% in unknown condition, 23% in no need, 14% in need, 4% in urgent need.

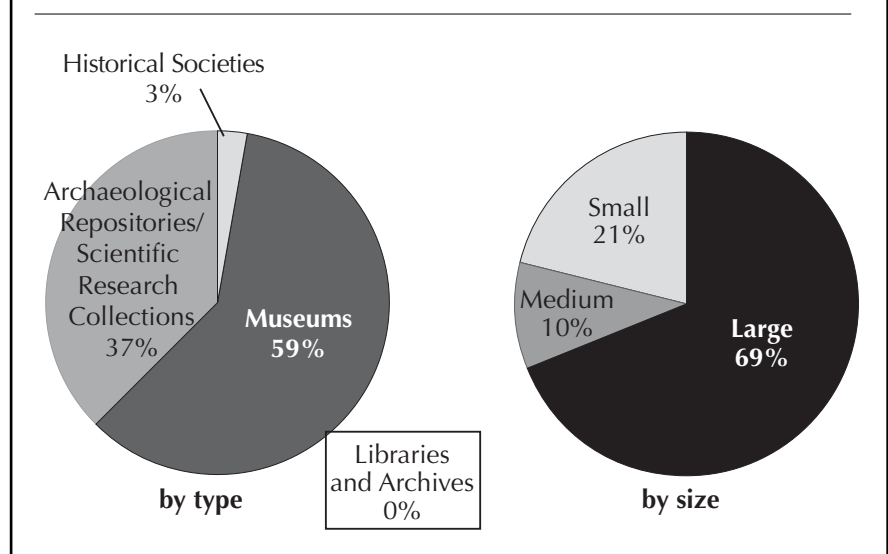
Figure 4.43 shows historic and ethnographic objects by specific type. Ceramic and glass artifacts, followed by textiles, are in the greatest numbers. Ethnographic/organic collections have the highest percentage in urgent need at 9% and in combined need and urgent need at 36%. Specific types

organizations hold most historic and ethnographic objects at 57%, followed by state at 27%, federal at 8%, county/municipal at 7%, and tribal-governed institutions at less than 1%.

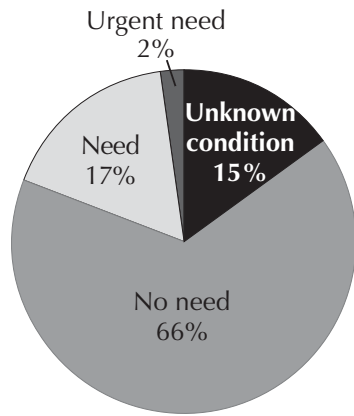
Twenty-eight percent of historic and ethnographic objects are in unknown condition, 44% are in no need, 23% in need, and 5% in urgent need (figure 4.42). Historic and ethnographic objects are second, behind unbound sheets cataloged by item, as the collections in the greatest need (figure 4.9). Museums, which hold the largest number of historic and ethnographic objects (more than 34 million), have similar condition figures to the national average, with the exception that 6% are in urgent need. At historical societies, 32% are in unknown condition, 38% are in no need, 24% are in need, and 6% are in urgent need. Small institutions have 35% of historic and ethnographic objects in unknown con-

do not add to the total of 48 million items because some institutions could only record historic and ethnographic objects in total. Other historic and ethnographic objects include architectural elements or models and mixed collections identified by subject matter, such as advertising or promotional items or war artifacts.

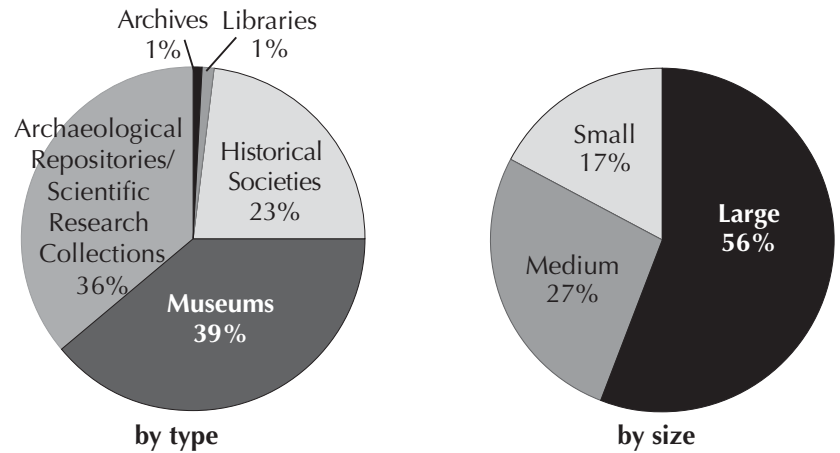
**Fig. 4.44 Institutions Care for 198 Million Archaeological Items**



**Fig. 4.45 Condition of Archaeological Collections (individually cataloged)**



**Fig. 4.46 Institutions Care for 2.6 Million Cubic Feet of Archaeological Collections**



**Archaeological Collections, Individually Cataloged**

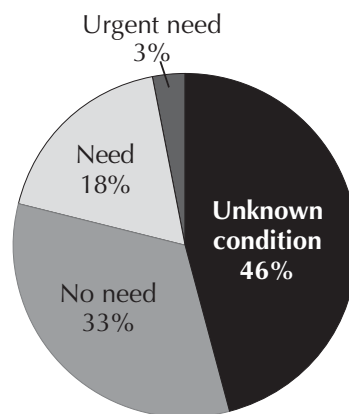
Archaeological collections recorded in individual items and cubic feet are considered separately. Each category included two specific types: organic-based material (e.g., textile, fiber, wood, bone, shell, feather) and inorganic material (e.g., ceramic, glass, metal, plastics).

U.S. collecting institutions care for 198 million archaeological collections items. Museums hold 59% of these collections, archaeological repositories/scientific research collections 37%, historical societies 3%, and libraries and archives less than 1% (figure 4.44). Combining individually and bulk cataloged archaeological collections, half of museums have such holdings, as do 45% of historical societies, 36% of archaeological repositories/scientific research collections, 22% of archives, and 8% of libraries. Large institutions have 69% of archaeological collections items, small institutions have 21%, and medium-sized institutions have 10%. State institutions hold 68% of archaeological collections items; federal institutions hold 20% and nonprofit organizations

hold 11% (county/municipal and tribal-governed institutions have less than 1%).

The condition of archaeological collections items includes 15% in unknown condition, 66% in no need, 17% in need, and 2% in urgent need (figure 4.45). Museums, which hold approximately 118 million archaeological collections items, have 21% in unknown condition, 61% in no need, 15% in need, and 3% in urgent need. Archaeological repositories/scientific research collections, which hold 74 million archaeological collections items, have 3% in unknown condition, 77% in no need, 19% in need, and less than 1% in urgent need. The condition of archaeological collections items at large institutions is close to the national average; at small institutions, 11% are in unknown condition, 85% in no need, 4% in need, and less than 1% in urgent need. Nonprofit institutions have the greatest percentage in unknown condition at 33%, and federal institutions have the greatest percentage in combined need and urgent need at 20% (need 15% and urgent need 5%).

**Fig. 4.47 Condition of Archaeological Collections (bulk cataloged)**



and federal institutions have the greatest percentage in combined need and urgent need at 20% (need 15% and urgent need 5%).

**Archaeological Collections, Bulk Cataloged**

Archaeological collections cataloged in bulk, such as potsherds or other small items,

**Fig. 4.48 Condition of Archaeological Collections (by specific type)**

	Quantity	In unknown condition	In no need	In need	In urgent need
Individually cataloged organic-based material	37.6 million	24%	49%	25%	2%
Individually cataloged inorganic-based material	160.3 million	13%	71%	15%	2%
Bulk cataloged organic-based material	0.7 million ft <sup>3</sup>	48%	33%	16%	3%
Bulk cataloged inorganic-based material	1.9 million ft <sup>3</sup>	46%	33%	18%	4%

institutions report 56% of archaeological collections cataloged in bulk in unknown condition, 31% in no need, 10% in need, and 3% in urgent need. Nonprofit institutions, which hold most of the archaeological collections cataloged in bulk, have 61% in unknown condition, 24% in no need, 13% in need, and 3% in urgent need. Federal institutions have 46% in unknown condition, 37% in no need, 16% in need, and 1% in urgent need. State institutions have 32% in unknown condition, 37% in no need,

total 2.6 million cubic feet. Museums hold 39%, archaeological repositories/scientific research collections hold 36%, historical societies hold 23%, and archives and libraries each hold 1% (figure 4.46). By size, large institutions have 56% of archaeological collections cataloged in bulk, 27% are held by mid-sized institutions, and 17% are held at small institutions. Nonprofit institutions hold 44% of archaeological collections cataloged in bulk; state institutions hold 36%; federal and county/municipal hold 9% each; and tribal-governed institutions hold 2%.

26% in need, and 4% in urgent need.

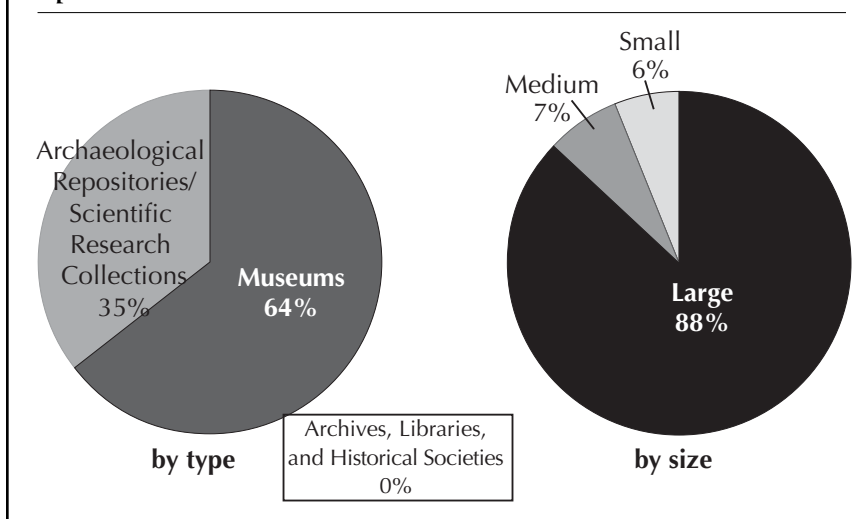
Figure 4.48 shows the specific types for archaeological collections. Since these types are broadly defined, an “other” category is not included. Individually cataloged organic material is in the greatest need. The level of need may be the same with bulk cataloged organic materials, if the condition were known.

Almost half of archaeological collections cataloged in bulk are in unknown condition (46%), 33% are in no need, 18% are in need, and 3% are in urgent need (figure 4.47). Historical societies have the greatest percentage in no need at 83%, followed by libraries with 72%. Only 24% of archaeological repositories/scientific research collections have archaeological collections cataloged in bulk in unknown condition. Libraries cite the highest percentage in urgent need, but this only accounts for about 3,000 cubic feet of collections since libraries have such small holdings in this area. Large

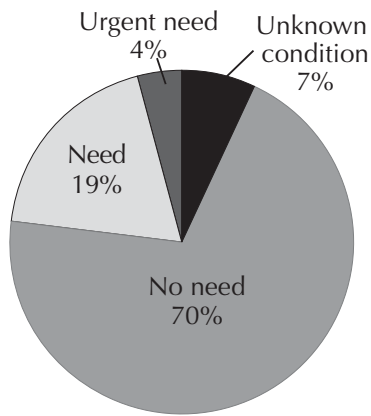
### Natural Science Specimens

Natural science specimens include zoological specimens (dry, glass slide, and frozen); zoological specimens (wet preparations); botanical speci-

**Fig. 4.49 Institutions Care for 820 Million Natural Science Specimens**



**Fig. 4.50 Condition of Natural Science Specimens**



mens (dry, glass slide, frozen, culture, palynology); botanical specimens (wet preparations); geological specimens; vertebrate paleontological specimens; invertebrate paleontological specimens; paleobotany specimens; and other natural science specimens. The Natural Science Working Group advised that wet preparations be separated from other preparations because of the specific preservation needs of these items. Institutions were instructed to record all collections in items, not in lots. In reviewing some of the figures for natural science specimens, some of Heritage Preservation’s advisers found the quantities to be lower than expected. RMC followed up with several institutions they suspected had reported collections in lots, and some submitted corrections; however, it is possible that other such errors

exist in this data.

**Fig. 4.51 Condition of Natural Science Specimens (by specific type)**

	Quantity	In unknown condition	In no need	In need	In urgent need
Zoological specimens (dry, glass slide, and frozen)	231.5 million	4%	77%	15%	3%
Zoological specimens (wet preparations)	308.4 million	3%	76%	17%	3%
Botanical specimens (dry, glass slide, and frozen)	118.5 million	11%	69%	18%	2%
Botanical specimens (wet preparations)	0.3 million	19%	38%	41%	2%
Geological specimens	7 million	18%	65%	15%	2%
Vertebrate paleontological specimens	30.5 million	10%	50%	31%	9%
Invertebrate paleontological specimens	109.1 million	11%	52%	28%	8%
Paleobotany specimens	11.7 million	15%	25%	48%	13%
Other natural science specimens	3 million	75%	14%	11%	0%

U.S. collecting institutions care for 820 million natural science specimens. Museums hold 64% and archaeological repositories/scientific research collections hold 35%, with archives, libraries, and historical societies holding less than 1% each (figure 4.49). These collections are divided among 86% of archaeological repositories/scientific research collections, 38% of museums, 27% of historical societies, 9% of archives, and 7% of libraries. Large institutions hold 88% of natural science specimen collections, medium-sized institutions hold 7%, and small institutions hold 6%. State institutions hold most natural science specimens at 47%, followed by nonprofit institutions at 32%. Federal institutions hold 15%.

Of all collections, natural science specimens have the smallest number in unknown condition (7%) (figure 4.50). Most natural science collec-

tions are in no need (70%); 19% are in need and 4% are in urgent need. At the two types of institutions that hold the most natural science specimens, museums have 9% in unknown condition, 64% in no need, 23% in need, and 4% in urgent need; archaeological repositories/scientific research collections have 2% in unknown condition, 82% in no need, 11% in need, and 4% in urgent need. Large institutions, which hold 720 million natural science specimens, have 6% in unknown condition, 71% in no need, 19% in need, and 4% in urgent need. Federal institutions have the greatest percentage in need and in urgent need (25% and 11% respectively).

Figure 4.51 shows the quantity and condition of specific natural science collections. Zoological collections (wet preparation) account for the highest number of holdings, followed by the remaining zoological collections. Paleobotany specimens are in the greatest urgent need and greatest need and urgent need combined. Other natural science specimens include unspecified items such as “herbarium collections,” “rock and fossil collections,” etc.

The following chapters will discuss the reasons for collections items in need or urgent need, as well as the high percentage of items in unknown condition.