

## COLLECTIONS RESOURCES



The Smithsonian is a vast institution that uses considerable resources to fulfill its research, education, and public access missions.

In September 2000, it employed 6,528 people,<sup>1</sup> occupied 7.7 million sq ft,<sup>2</sup> and spent \$634 million on mission-driven activities including collections management, research, exhibitions, education, and administration/support.<sup>3</sup>

Because of the continuing growth of collections and constant changes in professional standards for collections care, the level of resources required for sound collections management is always a moving target. However, it is possible to identify areas where a lack of resources is having detrimental effects on Smithsonian collections and their management. This chapter examines five major categories of collections management resources at the Smithsonian — funds, personnel, storage facilities, information technology, and supplies and equipment — and discusses where shortfalls of these resources existed at the time of this writing and prospectively, as well as the consequences of such shortcomings.

## FINDINGS

This section separately discusses each of the five categories of resources noted above: funds; personnel; storage space; equipment and supplies; and information technology.

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<sup>1</sup> The total number of Smithsonian employees has remained relatively constant over the past decade. For example, there were 6,686 full- and part-time employees in September 1994 and 6,290 in September 2003 (Smithsonian Institution, Office of Equal Employment and Minority Affairs, various years).

<sup>2</sup> Of this space, 0.8 million sq ft were leased, and the rest was spread among two dozen Smithsonian-owned buildings. Of the total, about 2.2 million sq ft were for offices; 1.7 million for collections storage; 1.7 million for public uses; 0.6 million for laboratories; and 1.4 million for other uses. OFEO conducted an update of the Smithsonian space inventory in FY2000. Since the OP&A survey requested information covering that fiscal year, this description used data from September 2000.

<sup>3</sup> In total, Smithsonian expenditures amounted to slightly more than \$821 million, when expenditures on revenue-producing auxiliary activities such as *Smithsonian Magazine*, shops, catalogues, IMAX theaters, food service, tours and other Smithsonian Associates activities, and fundraising and membership are included.

## financial resources

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### sources of funding for collections expenditures

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According to data from the Smithsonian Financial System (SFS), collections have depended on federal appropriations to a greater extent than exhibitions, education and public programs, and research.<sup>4</sup> In FY2000, only about one fifth of collections expenditures came from trust funds, and this was mainly for acquisitions (Table 8). Federal appropriations paid for the remaining four fifths of collections expenditures. By contrast, more than two fifths of exhibition funds and about half of both research and education/public program funds came from philanthropy, grants, contracts, and other non-federal sources.<sup>5</sup> Units also raised a small amount of trust funds for collections from the nominal fees they charged for certain collections services, such as photocopying.

A number of collecting units have raised considerable philanthropic funds to pay for the construction of open storage collections facilities, the most notable example being NASM's UHC. Still others, such as AAA, have secured grants for collections management projects. A few donated collections have come with funds for continuing care. And substantial philanthropic contributions have paid temporary conservators to work on some Smithsonian icons, such as the Star-Spangled Banner.

As discussed in Chapter 5, disposals of objects by sale can produce significant trust revenue. However, Institutional policy requires that the proceeds from sales be used only for acquisitions and related direct expenses and for deaccessions and disposals related to acquisitions, not for general collections management (see Appendix F). At

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<sup>4</sup> SFS was the Smithsonian's accounting system at the time this study began. The Enterprise Resource Planning (ERP) financial system has since replaced it.

<sup>5</sup> The majority of grants and contracts, especially for research, were from federal agencies.

the time the research for this study was completed, it was unclear whether the Smithsonian would consider allowing units to use such proceeds for general collections care.

**Table 8. Smithsonian Institution, Expenditures by Sources of Funds and Functions, FY2000**

Functions	Trust funds (\$)	Federal appropriations (\$)	Total funds (\$)	Trust (%)	Federal (%)
Research	60,583,043	59,754,514	120,337,557	50	50
Collections	14,169,832	53,513,167	67,682,999	21	79
Education and public programs	27,739,792	26,829,292	54,569,083	51	49
Exhibitions	23,960,266	31,669,597	55,629,863	43	57
General administration	53,307,027	104,970,335	158,277,362	34	66
Facilities	9,932,780	126,835,973	136,768,753	7	93
Security and safety	1,112,799	39,624,347	40,737,146	3	97
Membership and donor programs	22,828,742	1,076,067	23,904,809	95	5
Business activities, tours, and seminars	163,472,421	91,198	163,563,620	100	0
Total expenditures	377,106,702	444,364,490	821,471,192	46	54

*Source:* Smithsonian Institution Office of Planning, Management, and Budget.

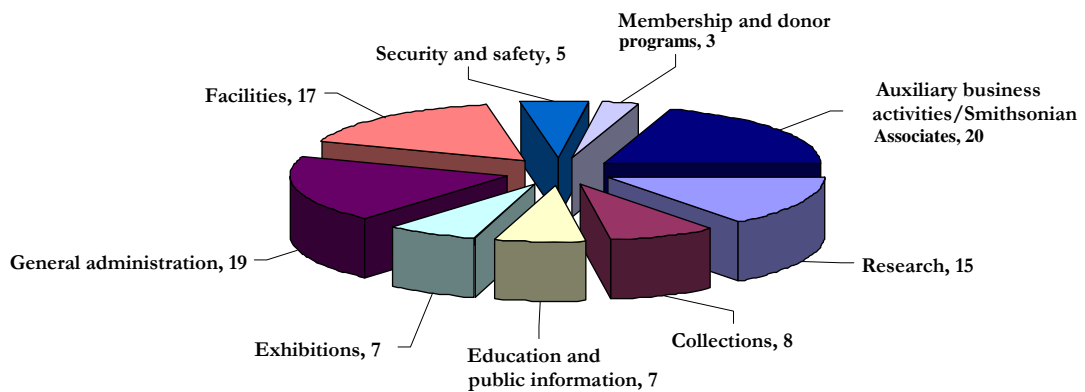
*Note:* Includes federal grant and contract expenditures, which, according to Smithsonian accounting principles, must be reported as trust expenditures.

### collections expenditures by function

According to SFS reports provided by the Office of Planning, Management, and Budget (OPMB), the Smithsonian spent less on collections in FY2000 than on research, but more than on other programmatic activities such as education,

exhibitions, and public programs (Table 8 and Figure 6).<sup>6</sup> At almost \$68 million (8 percent of all expenditures), reported collections expenditures were slightly more than half of research expenditures<sup>7</sup> (which were just over \$120 million, or 15 percent of total Smithsonian expenditures), and slightly more than spending on either exhibitions (about \$56 million) or education and public programs (about \$55 million), each of which accounted for about 7 percent of total expenditures. Administration and facilities together accounted for about 36 percent of all expenditures.<sup>8</sup>

**Figure 6. Distribution of Smithsonian Expenditures, FY2000 (percent)**



*Source:* Smithsonian Financial System, FY2000 data.

<sup>6</sup> Excluding expenditures on income-generating activities such as Smithsonian Business Ventures (SBV). SBV expenditures were larger than expenditures on any single programmatic area. Expenditures were entered into SFS by major operational activities or functions, such as collections, research, exhibitions, and development.

<sup>7</sup> The “research” category includes the expenditures of nonmuseum units such as SAO, SERC, and STRI. In FY2000, SAO, which obtains a significant number of large contracts and grants, spent twice as much (\$70 million) on research as all Smithsonian museums spent.

<sup>8</sup> OPMB was unable to furnish historical data on the distribution of Smithsonian expenditures because budgetary and financial systems and accounting software have changed several times in recent years.

Based on the estimated expenditures reported on the OP&A collections survey, Smithsonian museums, archives, and libraries spent more on collections in FY2000 than the SFS data show. Official SFS expenditures on collections were consistently lower than the expenditures reported in the survey.<sup>9</sup> For example, SIA and AAA reported expenditures 60 percent higher than the SFS figures; those for SCMRE were 150 percent higher.

There are two reasons for the discrepancies. The first is that SFS and its predecessor financial systems did not utilize an activity-based cost accounting system. Thus, units might report expenditures entirely in one category (such as research), even when part of the staff time and other resources involved was spent on activities within other categories (such as collections). For example, a curator might have been fully accounted for in the “research” category, for purposes of SFS reporting, even if she also spent time on collections management activities. In the OP&A survey, by contrast, the fraction of such a curator’s time devoted to collections management was reported as a collections cost.<sup>10</sup>

The second reason OPMB figures understate actual collections expenditures is that while Smithsonian financial reports capture the direct spending of individual units by major function, many facilities-related expenses (such as security, maintenance, and utilities), as well as development and other centrally provided services, are reported as central Smithsonian expenses, rather than individual collecting unit expenses. Therefore, not only do total expenditures by individual units appear lower than expenditures at comparable non-Smithsonian museums, but the costs of collections management appear lower than they would if these expenses were fully apportioned across the major expenditure functional categories.

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<sup>9</sup> Many units based their estimates on their own informal accounting (cuff) systems when responding to the OP&A survey. The expenditures do not include those of HMSG and C-HNDM, which did not respond to the financial questions, or of SAAM and NASM, which provided only partial responses.

<sup>10</sup> Very few public agencies compartmentalize costs into neat organizational cost centers. Even when they do, it is difficult for employees who work for several units or on different activities to allocate their time accurately. However, continuous improvement of the financial system and more accurate reporting are parts of the Smithsonian’s overall goal of management excellence. ERP is intended to improve this type of record keeping as compared with SFS.

Across Smithsonian units that provided usable estimates of collections expenditures in response to the OP&A survey, the reported spending on collections was \$66.6 million, compared to the \$52 million reported for the same units in SFS figures<sup>11</sup> — that is, after the units that did not fully respond to the OP&A survey were deleted from the official figures. According to the survey, museums, archives, and libraries spent 31 percent of all their expenditures on collections, rather than the 23 percent suggested by SFS statistics.

Even the OP&A survey estimates may understate actual expenditures on collections management, because the central Smithsonian administration invests additional, unreported resources in the care and management of collections. For example, the units included expenditures on physical plant facilities in the survey only if they paid for leased storage space themselves. Also, as noted, centrally provided and budgeted services such as security, utilities, and maintenance were not charged to individual units as expenses, and the survey figures did not include these expenditures.

### **collections expenditures by object category**

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Collections management is labor-intensive. Museums responding to the FY2000 OP&A survey reported that 74 percent of all collections-related expenditures went for collections management staff. That percentage rises to 80 percent when noncollections staff time and contract labor are included. In comparison, museums reported spending 8 percent of total collections expenditures on acquisitions; 4 percent on structures and facilities; and 3 percent on materials and supplies. Archives and libraries spent a slightly smaller share on collections management staff (68 percent) and a larger share on purchases of supplies and equipment (11 percent).

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<sup>11</sup> Including \$2.1 million for the MSC.

Responding units reported spending approximately \$124,000 for leased collections space, exclusive of leases paid from central funds.<sup>12</sup>

Collections care (26 percent) and research and reference support (21 percent) accounted for nearly one half of museum collections management expenditures in FY2000<sup>13</sup> (Figure 7). Collections development (16 percent) and exhibition support (11 percent) combined for another one quarter of expenditures. In comparison, the various Smithsonian archives<sup>14</sup> spent the largest share of their collections expenditures on research and reference support (30 percent), collections development (20 percent), documentation (18 percent), and collections care (11 percent). The differences between the spending patterns of archives and museums reflect differences in areas such as exhibitions (which are typically more prominent in the missions of museums), collections care (museum objects are very different from archive items), and documentation standards.

## human resources

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Many interviewees identified human capital as the single most important collections resource issue facing the Smithsonian, especially in units that have experienced large

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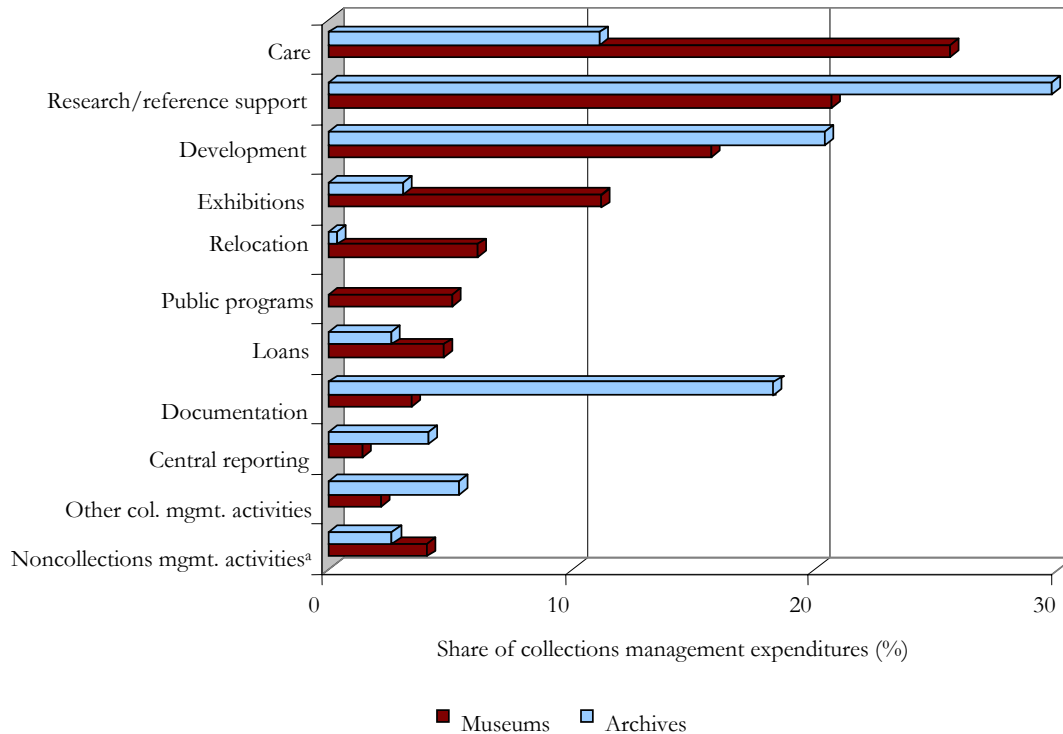
<sup>12</sup> According to OPMB, when centrally leased facilities were taken into account, the total cost of space leased by the Smithsonian for all uses — including but not limited to collections storage — was \$6.83 million in FY2000 (\$5.66 million from federal appropriations and \$1.17 million from trust funds).

<sup>13</sup> The OP&A survey asked units to estimate expenditures on “collections management programmatic activities” such as incoming and outgoing loans (excluding loans for exhibitions sponsored by the unit); Affiliations program support; exhibition support; reference services; research/study services; public programs/education support; and other programmatic support/services. In this context, “research” refers to reference and other support provided to researchers — not to research for documentation that was included in another category, nor to general research on collections that would be encompassed under the larger SFS “research” category.

<sup>14</sup> SIL figures are not included in the distribution of expenditures. Its entire \$1 million in expenditures were described as “other collections management activities” in the OP&A survey, so inclusion would have distorted the results. Likewise, the \$3.6 million that CFCH spent on Folkways music were deleted from the “noncollections management activities”; inclusion of these expenditures would have overwhelmed the remaining \$0.4 million in this category.



**Figure 7. Reported Collections Management Expenditures by Smithsonian Museums and by Archives, FY2000**



*Source:* OP&A FY2000 survey.

a. In the OP&A survey, “noncollections management activities” referred to “activities that use the resources of your collections management program, but that you do not consider to be part of your core collections management functions and responsibilities.” These included expert testimony, identifications, responses to media requests, and so forth.

decreases in personnel. Over the decade from 1994 through 2003, there were important changes in the numbers, required skills, and activities of Smithsonian collections personnel. Across the whole Institution, the number of staff in collections care positions decreased, although a few museums experienced increases when moving to new facilities or receiving new collections. In some cases, the decrease in staff caused difficulties in fulfilling the functions undertaken by these personnel, such as processing loans. At the same time, the number of researchers/curators held steady, and IT staff increased substantially. Further,

Smithsonian collections management staff are using different skills than they did a decade ago, in part because they are often involved in a wider range of activities. For example, curators increasingly work on collections management tasks not directly related to their research interests and training.

This section looks first at trends in the number of staff and then at how staff spent their time. It discusses the different status of collections management staff. The section finishes with a discussion of the impact of the changes in staffing levels.

### categories of personnel

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Traditionally, collections management staff have been categorized into two broad groups: collections care and collections research. Collections care staff are responsible for storing collections items, maintaining collections data, ensuring the physical condition of the collections, and making them accessible to users. Their job titles include archivist, conservator, registrar, museum registration specialist, and museum technician. Registrars, for example, keep track of the location, status, and documentation of objects. Conservators preserve collections for future generations by treating objects in poor condition, restoring them to their original condition and/or stabilizing them, and protecting them from deterioration. Museum technicians provide access to the collections by moving items into and out of storage.

Collections research staff are primarily research personnel, whose main collections responsibilities are to study and document collections and to provide some supervision. They have job titles like archaeologist, museum curator, botanist, zoologist, and museum specialist. (Some museum specialists, however, now spend a majority of their time on collections care tasks.)

More recently, a third class of staff has become involved with both collections care and research: the informatics personnel who operate the units' computerized CISs.

Informatics positions include computer specialist, web specialist, and database manager.

## distribution of collections management work

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The OP&A survey asked units to estimate the time spent by all their personnel on collections management during FY2000. The OP&A study team then looked at what categories of staff were involved with collections, and what percentage of their time was spent on particular collections management tasks.

### *collections-related work performed by all categories of staff*

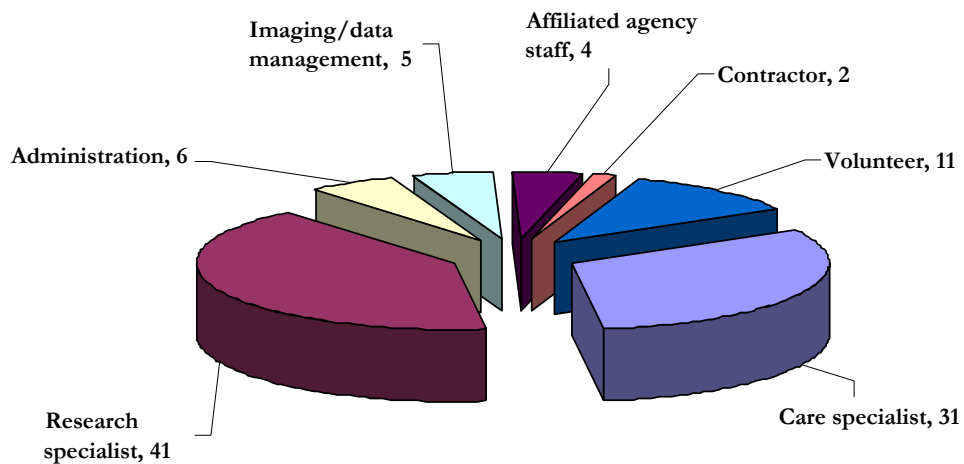
Figures 8 and 9 show the relative amounts of collections management work performed by different categories of workers in Smithsonian museums and archives/libraries, respectively. In FY2000, museums tended to have a larger share of collections management work performed by research specialists (and less by care specialists) than did the archives. The reason was that archivists and librarians were defined as “care specialists” rather than “research specialists.” Figure 8 indicates that collections care staff performed roughly one third of the work effort associated with managing Smithsonian museum collections, while collections research staff performed roughly 40 percent. Volunteers,<sup>15</sup> administrative employees, contractors, and employees of affiliated federal agencies who were stationed in Smithsonian facilities accounted for the remaining work. At Smithsonian archives and libraries,

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<sup>15</sup> The OP&A survey asked for the number of persons in job categories, not full-time equivalents (FTEs). Volunteers work part-time, and museums generally look for one day a week of work from a volunteer. When vacation, holidays, and other leave are taken into account, the number of hours worked by a volunteer averages about midway between one fourth and one fifth of those of a regular employee. OP&A set the number of volunteer FTEs at one fourth the number of volunteers reported; thus, the total work effort of volunteers is probably slightly overestimated. However, the relative distribution of responsibilities between categories (staff and volunteers) accurately represents the information from responding units.

individuals classified as collections care staff performed two thirds of the collections management work (Figure 9). A higher percentage of collections management work at the archives and libraries was performed by Smithsonian employees (92 percent) than at the museums (83 percent).

**Figure 8. Distribution of Collections Management Work in Smithsonian Museums by Type of Worker, FY2000 (percent)**



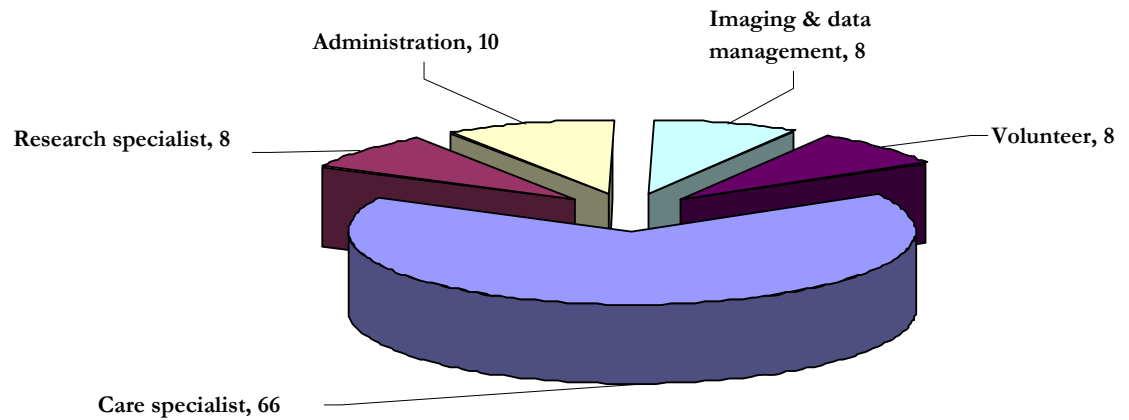
Source: OP&A FY2000 survey.

### *amount of time staff spent on collections-related activities*

The average museum staff member with collections responsibilities of any kind spent about two thirds of his or her time on collection tasks in FY2000, with a range from 100 percent to 1 percent or less. The average library/archives staff member with collections responsibilities of any kind spent an average of three quarters of his or her time on collections tasks. In the case of designated collections management staff, many routinely performed more than one task.

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**Figure 9. Distribution of Collections Management Work in Smithsonian Archives and Libraries by Type of Worker, FY2000 (percent)**



*Source:* OP&A FY2000 survey.

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By far the largest portion of collections management time for both archives and museum personnel who worked on collections went to providing ongoing care and documentation of collections, which consumed about one quarter of the average staff member's time (Table 9).<sup>16</sup> These tasks took up an even greater proportion of volunteers' and contractors' time. Table 9 demonstrates that volunteer labor is important to collections management, especially for ongoing care and documentation, even though Smithsonian staff handle the majority of the work. Across all collecting units, volunteers provided about 10 percent of all collections management labor.

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<sup>16</sup> OP&A developed these approximations by limiting total work time to the actual time that the average staff member with collections responsibilities spent on collections-related tasks. Staff with no collections management responsibilities were excluded.

Central reporting requirements, in the aggregate, consumed only a small fraction of staff time. Units estimated that such requirements consumed no more than 3 percent of collections management time. Nevertheless, some interviewees asserted that they perceived central reporting as a burden.

**Table 9. Allocation of Smithsonian Staff, Volunteer, and Other Labor Time to Collections-related Tasks: Archives/Libraries and Museums, FY2000**  
(percent of average collections management work effort per activity)

Collections management activity	Archives & Libraries		Museums			
	Smithsonian staff	Volunteers & interns	Smithsonian staff	Affiliated agency staff	Contract staff	Volunteers & interns
Collections development	10	0	11	3	0	12
Ongoing care and documentation	40	53	44	58	98	72
Exhibition support	3	9	11	1	0	14
Internal reference & research services for museum users	9	0	5	12	0	0
Internal research/study services for archive & library users	2	0	n.a.	n.a.	n.a.	n.a.
External reference & research services for museum users	13	29	5	12	0	0
External research/study services for archive & library users	1	0	n.a.	n.a.	n.a.	n.a.
Outgoing loans for affiliates	n.a.	n.a.	1	0	1	0
Other outgoing loans <sup>a</sup>	1	0	4	9	0	0
Incoming loans <sup>a</sup>	n.a.	n.a.	2	3	0	2
Interlibrary loans	2	4	n.a.	n.a.	n.a.	n.a.
Public programs/education support	2	0	7	1	1	2
Central reporting requirements/services	3	0	2	0	0	0
Other activity	14	3	9	1	0	0
Total collections management effort	100	98 <sup>b</sup>	101 <sup>b</sup>	100	100	102 <sup>b</sup>

*Source:* OP&A FY2000 survey. Data exclude employees with no collections management responsibilities.

n.a. Information not available.

a. Respondents were instructed to exclude loans, both incoming and outgoing, related to exhibitions sponsored by the responding unit.

b. Totals may not add to 100 percent due to rounding.

## trends in the size of the collections management workforce

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In matters of personnel, all federal entities are subject to influence by external actors. Change in the number of federal staff working for the Smithsonian is a function of decisions by OMB and the Congress, as well as internal decisions. For example, the Whitten Amendment, passed in the 1950s, was a historic antecedent to the periodic reductions in the size of the civilian federal workforce. Such cutback measures have included reductions-in-force, outsourcing work to the private sector, ceilings on hiring, hiring freezes, and realigning job responsibilities. By contrast, changes in trust-funded positions at the Smithsonian are directly subject to the authority of Smithsonian management.

The Smithsonian, as well as many other federal entities, saw a substantial decrease in the number of its federal employees between May 1994 and May 1997, reflecting efforts to reduce the federal workforce.<sup>17</sup> During the same period, trust employment increased, reflecting an attempt by Smithsonian management to offset the losses in federal positions. Since May 1997, federal positions at the Smithsonian have remained relatively constant; trust jobs continued to increase until May 2001, when the number of trust jobs dropped drastically as a result of the decline in revenue after September 11. In the case of federal employment, the Smithsonian has fared better than the National Gallery of Art, National Archives and Records Administration, National Aeronautics and Space Administration, and total federal workforce, but not as well as the National Institutes of Health, National Park Service, and the US Holocaust Memorial Museum (see also Appendix H).

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<sup>17</sup> The data on Smithsonian trust and federal employment for FY1994 to FY1996, and Smithsonian trust employment for FY1997 to FY2003, came from the National Finance Center. Its data are available from FY1994 to the present. The data for total federal employment in all agencies are from FedScope on the Office of Personnel Management website (<http://www.fedscope.opm.gov/>).

### collections-related position descriptions in art museums

Below are some important collections-related job titles at art museums, with descriptions of the primary responsibilities. They are illustrative; similar positions at other types of museum might have slightly different responsibilities.

**Chief conservator** — provides general supervision of conservation department, including administration of the budget and department personnel; initiates and supervises treatments carried out in conservation and scientific laboratories; performs conservation treatments on special projects.

**Senior conservator** — responsible for examination, conservation, and restoration of major collections, and exhibits in an area of specialization; prepares conservation reports; supervises professional assistants.

**Associate conservator** — assists senior conservator in the conservation, restoration, and documentation of objects in the collection; helps train assistants in conservation technologies.

**Director of information systems** — responsible for overall vision and coordination of the museum's information and communications systems, and the integration of computer and communications technology into the museum's programs; supervises other technology professionals.

**Systems manager** — typically responsible for one major component of the museum's technology, such as managing office computer systems and software; or managing new media technologies such as websites and interactive gallery kiosks. May supervise some subordinate staff and/or volunteers.

**Chief curator** — assumes general administrative responsibilities for curatorial affairs, plus other museum administrative responsibilities; maintains a high level of contact with the public and donors; supervises curatorial departments and staff.

**Curator** — responsible for general oversight of particular collections; assumes general administrative duties relating to these collections; supervises curatorial subordinates.

**Photographer** — responsible for photographic documentation of collections; supervises studio and dark room facilities and personnel; undertakes and oversees photography of general museum activities and events, as required by museum staff.

**Registrar A** — responsible for organization and maintenance of orderly forms, legal documents, files, and retrieval systems associated with collections acquisitions, deaccessions, cataloguing, inventory, loans, packing, shipping, customs, insurance, and storage; oversees shipping arrangements; may have responsibility for supervision of subordinate registration staff.

*Source:* Association of Art Museum Directors (2001b).



To examine changes in collections management staffing, OP&A analyzed the Smithsonian workforce between May 1994 and May 2003 using National Finance Center (NFC) data.<sup>18</sup> Table 10 shows changes in the number of personnel in collections care and collections research positions over that decade at the Smithsonian's officially designated collecting units. Collections care jobs decreased by 8 percent between May 1994 and May 2000, and by an additional 9 percent in the next three years. By contrast, the number of collections research positions dropped from May 1994 through May 2000 and then increased to a number in May 2003 that slightly exceeded that in May 1994. Unit-level IT positions<sup>19</sup> (not shown in Table 10), not all of which were necessarily associated with collections management, increased by, respectively, 50 percent and 17 percent from May 1994 to May 2000 and from May 2000 to May 2003. Most units saw increases in their IT staff over the decade. In part, this pattern reflected a shift from central maintenance of computer resources to unit-level maintenance.

These Institution-wide figures conceal important differences across units. While collections care positions decreased overall by 17 percent between May 1994 and May 2003, some units had much larger decreases, while others actually experienced increases. The most seriously affected units were NMNH, where collections care positions dropped by 56 percent, and NMAH, which saw a decline of 51 percent. At the other end of the spectrum, NMAI collections care positions rose by 300 percent, reflecting the need for more staff to handle the move of the Heye collection from the Bronx to the CRC at Suitland and the new NMAI museum on the Mall.<sup>20</sup>

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<sup>18</sup> The data cover only Smithsonian employees — not contractors, volunteers, and staff of affiliated federal agencies. They do not tell what portion of an employee's work was devoted to collections management and have not been adjusted for part-time status. OP&A searched the NFC files for job titles and employment series that have principal collections management responsibilities. Other employees may also have some collections management responsibilities (such as senior managers and generic museum technicians and museum aides).

<sup>19</sup> Some IT workers from central units such as OCIO also are assigned to the units, but there is no way to identify such central employees from the NFC data files.

<sup>20</sup> The number of positions categorized as "care" at NMAI increased from 23 to 69. During this period, NMAI opened the CRC at Suitland, moved its collections there from a facility in the Bronx, and began construction of the Mall museum building. These developments help explain the large increase in collections care staff.

**Table 10. Collections-related Workforce Assignments of Officially Designated Collecting Units, May 1994 to May 2003**  
(number of employees)

	<b>Collections care (control, care, conservation, etc.)</b>	<b>Collections research (documentation, research, etc.)</b>
May 1994	557	723
May 1995	548	710
May 1996	524	704
May 1997	511	697
May 1998	509	691
May 1999	483	695
May 2000	510	698
May 2001	499	701
May 2002	479	725
May 2003	463	729

*Source:* National Finance Center (US Department of Agriculture) personnel records.

To the extent that collections size can be considered a proxy for collections care workload, changes in collections care personnel do not appear to parallel changes in workload. For example, in contrast to the steep declines in collections care personnel at NMNH and NMAH, object collections increased by 2.4 percent between May 1994 and May 2002 (from about 122 million to 125 million items) at the former, and by 4.5 percent (from 3.0 to 3.2 million items) at the latter.<sup>21</sup> Even more notably, NASM's collections grew by 47 percent, but collections care staff fell by 39 percent.<sup>22</sup>

<sup>21</sup> At the time the research for this study was completed, FY2002 was the last year for which collections size and number of loans were available, since NCP had not yet published the FY2003 statistics.

<sup>22</sup> This collections growth does not primarily represent new acquisitions; rather, a major factor in the increase of NASM collections was the reclassifying of lots (often boxes) as specific collection items.

There were also significant differences in collections research staff trends across units. Between May 1994 and May 2003, NMAH's research positions decreased by 28 percent, and NMNH's by 6 percent. In contrast, in preparation for the opening of UHC, NASM collections research staff increased by 27 percent.

Between May 1994 and May 2003, on average new Smithsonian hires were younger than the employees who left. However, because of staff reductions and fewer new hires, the collections care workforce was older in May 2003 than in May 1994. The average age was 44 years in May 2003, up from 39 years in May 1994. The average age of collections research employees increased less over this period, going from 45 years in May 1994 to 48 years in May 2003.

The averages obscure an interesting aspect of the aging of collections staff: dramatically rising percentages of personnel are approaching retirement age. In May 2003, 16 percent of collections care staff were 55 years of age or older; in May 1994, the figure was only 8 percent. Even more dramatically, 25 percent of collections research staff were over 55 years of age in May 2003 — up from about 20 percent in May 1994 (7 percent were over 65, up from 5 percent). Overall, nearly half of collections care staff and more than three fifths of collections research staff will reach or approach potential retirement age within the next decade (aged 45 and older in May 2003). As many organizations have found, large numbers of retirements within relatively few years provide opportunities to restructure the workforce by creating new positions and eliminating others. Another potential advantage of such concentrated retirements is the opportunity to hire employees with different skill sets, especially in technology, thus reducing the need to retrain a large percentage of employees. On the other hand, with the retirement of a large cohort of long-time employees, the Smithsonian will lose a significant part of its institutional memory. This loss could pose a problem in dealing with inadequately inventoried and documented collections, since those staff are part of the informal “collection information system.” Also, highly specialized skills and knowledge about how to care for collections with unique needs will be lost.

### federal employee separation rates

The percentages of employees leaving the Smithsonian to go to another federal agency or to leave the federal civilian workforce was comparable to those of other similar federal agencies in the period FY1998 to FY2002.

#### Average Employee Separation Rates FY1998 to FY2002 by Federal Agency (percent of federal civilian employment)

	Federal civilian	Smith- sonian	NGA	Holo- caust	NPS	NARA	NASA	NIH	NSF
Total agency	13	12	11	15	38	19	6	14	18
Professional	9	6	6	9	10	5	5	13	22
Administrative	9	9	11	10	23	8	6	7	7
Technical	20	13	10	21	64	8	7	26	11
Clerical	30	25	37	36	64	33	17	29	82
Other white collar	13	14	11	13	14	*	65	45	*
Blue collar	16	11	11	4	46	5	6	6	*
Exhibits specialist (Series 1010)	7	11	5	0	6	8	**	**	**
Museum curator (Series 1015)	4	6	3	3	5	4	**	**	**
Museum specialist/ technician) (Series 1016)	16	9	6	21	42	16	**	**	**

*Source:* FedScope and the Office of Personnel Management.

*Note:* The average covers FY1999 to FY2003 for all categories except Clerical, Other white collar, and Blue collar, for which the years covered are FY2000 to FY2003. NGA=National Gallery of Art; Holocaust=US Holocaust Memorial Museum; NPS=National Park Service; NARA=National Archives and Records Administration; NASA=National Air and Space Administration; NIH=National Institutes of Health; NSF=National Science Foundation.

\* Agency did not have any employees in this category in at least one of the years averaged together.

\*\* Agency had no employees in these series. The National Institutes of Health employed no exhibit specialists in FY1998.

For the Smithsonian as a whole, over the past decade the trend has been toward a gradually decreasing percentage of federal employees.<sup>23</sup> This trend has affected both collections care and research staff. In the case of collections care positions, a small increase in trust positions was not enough to offset the reduction in federal positions. For collections research positions, however, the increase in trust positions was greater than the decline in federal positions, resulting in a small overall rise. Nevertheless, in both areas federal positions still made up a very large portion of total positions: 70 percent of research and 86 percent of care positions in May 2003.<sup>24</sup>

Another trend worth noting is that both care and research staff had smaller percentages of permanent employees in May 2003 than in May 1994. In May 2003, about 66 percent of collections care staff and 90 percent of collections research staff were permanent — compared with 79 percent and 93 percent, respectively, in May 1994.

### relative status of collections care staff

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The difference in the trends for collections care and research staff stems in part from the differing status and career prospects of the two areas. Traditionally, collections care jobs have been assigned lower grades than collections research (or IT) jobs.<sup>25</sup> For example, in May 1994, 50 percent of collections care positions were grade 8 or lower, while 4 percent were grade 13 or higher. Conversely, only 4 percent of

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<sup>23</sup> In FY2000, however, the number of federal employees at the Smithsonian increased, principally in the facilities program area, in response to the recommendations in the National Academy of Public Administration's "Study of the Smithsonian Institution's Repair, Restoration, and Alteration of Facilities Program" (National Academy of Public Administration 2001), and also in the Office of Protection Services, following September 11, 2001.

<sup>24</sup> The OP&A FY2000 survey requested information on contract labor for collections management tasks in FY2000, but trend data for contract labor were not available.

<sup>25</sup> Smithsonian federal positions are assigned grades between 3 and 15, reflecting both the education and experience qualifications required for a given position and its responsibilities. In addition, the Smithsonian has "senior" employees, equivalent to federal Senior Executive Service personnel, with responsibilities and qualifications that exceed those of the numbered grades.

collections research jobs were grade 8 or lower, and 24 percent were grade 13 and above. Few collections care positions, except supervisory and management positions, had grade levels above 11. (A few collections care job descriptions, such as registrar, cover a wide range of grades.) Several Smithsonian collections managers said that they had lost experienced collections care staff because the only advancement opportunities lay in transferring from collections care positions to others with higher classifications. More than half (54 percent) of collections research staff had a professional occupational category, compared to less than one fifth (18 percent) of collections care staff (almost exclusively librarians and archivists). There were no series devoted to collections management, especially collections care, paralleling the exhibitions and research series, and no professional category for conservators or collections managers.<sup>26</sup>

As noted, according to the FY2000 OP&A survey data, collections care personnel generally spent more time performing collections management tasks than collections research personnel did. For example, based on the aggregated survey responses from Smithsonian museums, conservation specialists and museum technicians spent 91 percent and 81 percent of their work time, respectively, on collections-related tasks. By contrast, curators and research scientists spent 52 percent and 51 percent of their time, respectively, on collections-related activities (not including work on their primary substantive disciplinary research). Thus, the loss of one collections care employee typically meant a greater loss of collections-related labor than the loss of one collections research employee.

Interestingly, the collections care workforce showed a marked decrease in the percentage of lower grade employees between 1994 and 2003, while the relative grade distribution of the collections research workforce remained approximately stable over that period. Between 1994 and 2003, the number of collections care employees in grades 3 through 8 decreased by 30 percent, and the number of

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<sup>26</sup> The current federal personnel system has occupational series for Exhibit Specialists (series 1010) and Museum Curators (series 1015), as well as series for different research specialties. Many collections care positions, as well as research positions, fall into series 1016 (Museum Specialists and Technicians), a technical occupational category.

personnel in grades 9 to 12 by 15 percent. The number of higher grade employees, including supervisors and collections managers, actually rose by 13 percent over this period. The overall result was a declining percentage of collections care personnel in lower grade positions. This occurred because units generally did not replace lower grade employees who left the Smithsonian or were promoted. One result is that higher grade supervisory staff and collections research personnel increasingly were performing collections care tasks.

Several collections managers interviewed by the OP&A study team, echoing the sentiments of Simmons (1993), said that one way to slow the turnover in collections care relative to collections research positions would be to elevate the professional status of the former. This shift may now be occurring. In recent years, universities have begun to develop distinct museum studies programs for collections management. As a result, more new hires with professional training in collections care and conservation and a minor in biology, history, or art are joining museums, rather than learning their care skills on the job.

### consequences of staff reductions

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Many interviewees noted overwork and exhaustion from having to work harder due to personnel losses. One interviewee said, “We have lost a lot of staff, and we’re being asked to do more. It’s not good for morale. Positions are not being replaced.” Another interviewee told a similar story: “Collections management staff has declined significantly. Ten years ago there were about 58 people doing the work that 23 do today.” Still another interviewee spoke about staff getting new jobs but having to keep their old ones as well: “If the museum continues to lose staff, remaining staff have to absorb added duties. . . . They are good jugglers, but juggling only goes so far.” The burden, according to some interviewees, appeared to fall most heavily on the best staff, with collections managers often noting that they depended disproportionately on staff members who were more dependable and productive.

Their fear was that ultimately the juggling would cause staff to leave the Smithsonian. On a brighter note, in general the OP&A study team found that interviewees identified personally with their collections and responded to the changes with increased work effort, little loss of motivation, and the hope of a brighter future.

Staff reductions have created difficulties in carrying out certain collections-related tasks. Although interviewees at all units referred to the same types of problems, NMAH, NMNH, and NZP seemed to experience them the most. One area that was frequently mentioned was the provision of onsite research access to collections, which tends to be labor-intensive (see Chapter 3). Another was processing collections and addressing documentation backlogs. For example, in the follow-up OP&A FY2003 survey, the paleobiology and anthropology departments at NMNH estimated that eliminating backlogs could take 10 years with current staff resources, and an interviewee from the invertebrate zoology department reported that maintaining an estimated 25 million item backlog was a strategic decision, because holding specimens in bulk state minimized demands for resources to identify and document them. Other museum units indicated smaller backlogs — five years at C-HNDM, four at NASM, and one at Anacostia. SAAM and NPG expected to maintain a modest backlog as collecting continued. Among the archives, some units (FSG, NASM, and HSD) projected backlogs of up to 10 years, although others (SIA, AAA, and NMAH) indicated that they did not have undocumented backlogs. However, archive interviewees also indicated that archives often consider unprocessed collections to be a routine part of operations.

Another area where the need for more staff was keenly felt was digitization. For example, NMNH recently considered the labor implications of digitizing its biology collections, which consist of 83,573,000 specimens.<sup>27</sup> As of June 2002, about 700,000 biology collection electronic records met NMNH's inventory standards —

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<sup>27</sup> Different biology departments have different cataloguing standards that require two to eight images per specimen, with average per-specimen imaging times ranging from seven to 90 minutes, not including preparation. NMNH's Associate Director for Research and Collections, Anna Weitzman, provided the following estimates in an e-mail to OP&A dated June 20, 2002. The information covers the following biology areas: botany, insects and spiders, other invertebrates, birds, amphibians and reptiles, mammals, fish, and molecular biology. Paleological biological specimens are not included.



the lowest level of information; another 3 million met its cataloguing standards; and another 74,000 were enhanced beyond cataloguing standards. Completing the digitization of all records to enhanced catalogue status would require an estimated 2,541 person-years.<sup>28</sup> (Even if the entomology collections were excluded, enhanced digitization would require 114 person-years to complete.) Across the Smithsonian, digitization of enhanced catalogue records would require substantial increases in the number of staff, contractors, and/or volunteers dedicated to the task, as well as significant facilities for electronic and physical storage. In this area, one unknown is the labor and cost implications of changes in professional, cataloguing, imaging, and storage standards likely to take place before the project is completed.

The processing of loans was an area frequently singled out by interviewees discussing staff shortages. This deserves a slightly longer discussion, as outgoing loans are a priority of the current central Smithsonian administration. Even though the OP&A FY2000 survey indicated that loans consumed less than 5 percent of collections management staff time Institution-wide (loans to Smithsonian affiliates took up about 1 percent of museum staff time), interviewees often conveyed the sense that loans were the straw breaking the camel's back. As one employee at C-HNDM noted, "Essentially, we have no resources to apply to lending. The 200 loans we are doing now are breaking our backs."<sup>29</sup> Several interviewees explicitly stated that their units have restrained their lending activity due to workforce shortages. Whether because of staff shortage or for other reasons, the number of outgoing Smithsonian museum loans has declined dramatically in recent years — by approximately 18 percent between FY2000 and FY2002, according to NCP data.<sup>30</sup>

OP&A FY2000 survey data indicate that Smithsonian museums together utilized 52 FTEs to process loans:<sup>31</sup>

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<sup>28</sup> For example, NMNH could complete the project in 10 years if 254 persons worked on the project full-time. Currently, 22 people are dedicated to digitization in biology.

<sup>29</sup> This number presumably includes all outstanding loans from C-HNDM, whereas Appendix Table G-1 in Appendix G shows loan transactions initiated during FY2000.

<sup>30</sup> FY2003 NCP data, received as this report was undergoing final review and editing, indicated a further decline of about 5 percent from FY2002.

<sup>31</sup> See Appendix G for a complete description of loans by unit.

- 12.2 FTEs to process 1,547 incoming loan transactions (excluding exhibitions loans), involving 329,491 items<sup>32</sup>
- 30.9 FTEs to process 1,953 outgoing loan transactions other than loans to affiliate museums, involving 187,635 items.
- 8.9 FTEs to process 20 outgoing loan transactions to affiliate museums, involving 388 items.
- The units estimated expenditures of close to \$870,000 on incoming loans; just over \$630,000 on outgoing loans to affiliates; and about \$2.2 million on other outgoing loans. Together, these expenditures amounted to approximately \$3.7 million, or a little more than 5 percent of all collections expenditures in FY2000. Thus, the average costs to process loans in FY2000 amounted to approximately
  - ✦ \$560 per loan (\$2.60 per loaned item) for incoming loans
  - ✦ \$1,130 per loan (\$12 per loaned item) for outgoing loans other than loans to affiliates
  - ✦ \$31,500 per loan (\$1,630 per loaned item) for outgoing loans to affiliates.

The far higher costs of affiliate loans stand out. While accounting for less than 1 percent of total loan transactions (4 percent if loans from NMNH are excluded), they consumed 17 percent of the staff time devoted to loans.<sup>33</sup> Some interviewees indicated that loans to affiliates, as with other small museums, require more time to handle, as discussed in Chapter 3.

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<sup>32</sup> Loans are documented as both transactions and objects. A single transaction may include more than one object.

<sup>33</sup> Smithsonian museums reported 26 loans to affiliates in FY2002, a modest increase from the 20 loans in FY2000.

The Institution-wide picture once again clouds important differences across units. For example, there were enormous variations in the numbers and per-loan costs of both incoming and outgoing loans across museums.<sup>34</sup> For example, NMNH, NMAH, NPG, and (to a lesser extent) NPM reported devoting considerably more staff time to affiliate loans than other Smithsonian units did.

## personnel needs

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Most units responding to the OP&A FY2003 survey indicated that they needed additional staff and/or contractors to handle current, unmet collections management requirements (Table 11).<sup>35</sup> The OP&A study team combined stated staff needs from responding museums and archives/libraries and estimated how many additional personnel all units needed to accomplish their unmet collections management needs. The result was an approximately 10 percent expansion in the Smithsonian collections care workforce, and an additional 2 percent increase in contractors, consultants, or affiliated agency staff (excluding volunteers).<sup>36</sup>

In terms of future needs, most museums predicted continued modest annual growth in collections of 3 percent or less, although AM/CAAHC projected annual growth of 10 percent. Several units indicated that collections management needs in FY2010 could be met without additional increases in staff beyond those required for current needs; others indicated that still more personnel would be necessary to handle the projected growth in collections (Table 11). At the high end, NPG, with an expected

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<sup>34</sup> The OP&A study team estimated the costs by multiplying the number of FY2000 loans reported to NCP by the units' estimates of the labor costs of processing the loans. Costs such as transportation and insurance were not included. The estimates are probably subject to an upward bias in the case of units that made few loans. In such instances, it may have been difficult to report accurately the very small percentages of staff time associated with loan processing. In a few cases, units reported loans with no associated labor, perhaps indicating that the loans required very little staff time. In a few other cases, units reported small amounts of staff time spent on categories in which no loans were reported, perhaps indicating aborted or in-process loans.

<sup>35</sup> The OP&A FY2003 survey did not explicitly ask units to estimate either content research or IT needs.

<sup>36</sup> These figures were not scaled up to account for nonresponding units.

annual collections growth rate of 2 percent, indicated a need for nine additional personnel by FY2010.<sup>37</sup> NMNH, with less than 0.5 percent expected annual collections growth but huge collections management backlogs, projected a need for eight additional personnel (five staff and three contractors). Several archives indicated a need for additional staff to handle collections growth through FY2010, although their stated requirements did not correlate with projected growth in collections. Combining the stated needs of responding museums and archives, dealing with 2010 collections needs would require a 6 percent increase in Smithsonian staff and a 2 percent increase in contract staff, beyond the increases needed to address current needs. Similarly, Smithsonian archives and libraries expressed a need for 20 staff immediately (17 employees and 3 contract staff) and an additional 10 (5 employees and 5 contract) by FY2010.

### changing staff responsibilities and skills

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The reduction in staff and greater use of technology have changed the composition of the work that different categories of staff perform. Interviewees emphasized that collections managers often are able to do more with fewer staff in part because they have adopted new technologies, such as electronic CISs, compact storage, collections barcoding, and new conservation techniques.

In particular, the introduction of centralized electronic CISs has affected the size, composition, and required skills of collections management staff. For example, when items are barcoded, it requires fewer staff to locate and process items. Similarly, networked CIS records facilitate documentation, with researchers having access to create and modify documentation more efficiently than under the legacy

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<sup>37</sup> Note that these nine personnel are *in addition to* the eight that NPG indicated it requires to meet its *current* needs. Other units' estimates of additional employees required for FY2010 should be read in the same way.

**Table 11. Estimated Needs for Additional Smithsonian Collections Care Staff, as Stated by Museums, Archives, and Libraries**

	Current unmet needs		Additional needs in FY2010	
	Staff	Contractor	Staff	Contractor
All responding museums <sup>a</sup>	33	7	24	5
C-HNDM	3	0	2	0
FSG	2	0	3	0
NASM	0	0	0	0
NMAfA	2	0	0	0
NMNH	10	3	5	3
SAAM	5	0	2	0
AM/CAAHC	2	2	3	2
NPG	8	0	9	0
HSD-Artifacts	1	2	0	0
Responding archives/ libraries <sup>a</sup>	17	3	5	5
AAA	2	0	0	0
HSD- Archives	1	2	0	0
FSG-Archives	1	0	0	0
NASM-Archives	2	0	2	0
NMNH-Archives	2	0	2	2
NMAH-Archives	4	0	0	0
SIA	5	1	1	3
SIL	0	0	0	0

*Source:* OP&A FY2000 and FY2003 surveys.

a. Museums and other object collecting units that did not respond to the OP&A FY2003 survey were AHHP, CFCH, HMSG, NMAH, NMAI, NPM, NZP, and SCMRE. Nonresponding archives/libraries included CFCH, NMAfA, NMAI, SAO, and SCMRE.

inventory systems, which utilized paper records or non-networked computers.<sup>38</sup> The increasing importance of electronic CIS systems may partly explain the personnel trends discussed above. Given a lack of resources to allow overall growth in collections management staff at the time the CIS systems were being created and developed, some unit managers may have followed a strategy of reducing the number of staff in collections care positions to create new informatics slots.

Interviewees commented that the decreases in staff and changing technology have prompted changes in the traditional compartmentalized work culture, with both collections care and research workers increasingly taking on, or being assigned, additional collateral duties to maintain quality of care. Thus, the boundaries between tasks performed by different categories of employees, contract staff, and volunteers have blurred in many units. Reactions to this trend differ. Some employees viewed performing diverse tasks as a defining part of their jobs, although others who were more steeped in the traditional Smithsonian work culture considered the performance of ancillary roles an unwelcome downside. Similarly, some staff have welcomed the challenge of learning new skills, while others have resisted. As one interviewee observed, “Over the last 15 years, we’ve asked the scientists to become database specialists and to develop computer competency. There are staff who either refuse to master these skills or are just unable to master them.”

Cross-training noncare staff to perform collections care tasks is one option that has worked in many areas of collecting unit operations. However, most interviewees argued that in many fields of collections care, such as conservation, staff require specific skills and experience that cannot be easily transferred. One interviewee said,

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<sup>38</sup> By way of example, prior to NASM’s adoption of TMS as its CIS, the museum kept information on objects in separate computer systems, backed up with written records. When an artifact was moved from storage to the conservation facility, the registrar had to locate the item, prepare a location change form, and record the information. Now, a number of staff are authorized to modify specific areas in the CIS file. Thus, a collections technician at Garber can utilize barcoded information to locate the item and record the move directly through onsite computer access. At the same time, a NASM curator could be adding new information on the artifact’s history into the TMS file, while a technician could be entering electronic images of the artifact.

“I can’t trust the collections to untrained volunteers and researchers.” The person also noted that conservation techniques are constantly changing as the field becomes increasingly professionalized. At the same time, there was a willingness to train volunteers, interns, and researchers to undertake a variety of collections care tasks. In fact, one staff member interviewed had recently hired several former interns as contractors to continue working on such tasks. In addition, some Smithsonian units have contracted for specific skills, especially IT and CIS, for which recruitment might be difficult or where the skills might become obsolete in a short time.

Beyond issues relating to mastering new and rapidly changing technologies, interviewees also commented that some collections staff lacked the skills to do their jobs well. One interviewee pointed out that “Much of the current [unit] staff is just too young and inexperienced, and those who could have provided mentorship and training are gone now.” A common theme was that decreases in experienced collections management staff and the mass retirements likely in the next decade make on-the-job training and mentoring of younger staff an increasing challenge.

This seems to argue for an increasing emphasis on formal training in required collections management skills. However, there has been very little funding for formal training. According to the information provided by survey respondents, Smithsonian museums spent a total of about \$51,000 on collections management training in FY2000 — nearly three quarters of which took place at a single unit (NMAI). Archives and libraries spent a little more (about \$66,000), led by SIA, which spent \$21,000.

Despite the sometimes significant changes in numbers, skills, and responsibilities of staff, no interviewees made reference to any systematic, Institution-wide planning of human resources, such as a general collections workforce analysis aimed at identifying the number and skills of staff needed in the various units. The interviews conducted for this study provided no examples of individual performance plans that specified upgrading of skills, nor did interviewees mention formal training plans to help them acquire different skills.

### many different categories of Smithsonian employees perform collections management tasks

NMNH staff perform a variety of collections management tasks, with the largest amounts of time going to scholarly research (as background for acquisitions and inventorying) and preservation and conservation of specimens. These responsibilities are spread widely across different categories of staff.

#### Share of collections management work in total work (%)

Collections mgmt. work activities	Collections mgmt. in total work	Smithsonian staff				Affiliated agency	Contractors	Interns, vols.
		Care	Research	IT	Other			
Scholarly research	26	*	80	*	*	20	*	*
Acquisitions	5	9	77	4	1	8	*	1
Deaccessions/disposals	1	2	69	23	1	5	*	*
Repatriation	3	50	39	10	1	*	*	*
Preservation/conservation	13	8	34	*	3	8	22	24
Storage	5	18	57	1	5	7	1	12
Routine collections care	2	1	33	*	*	*	2	61
Accountability and inventory control	6	2	41	31	6	4	12	3
Research for records enhancement	6	13	65	8	*	6	4	3
Reference and research								
NMNH user	7	4	69	2	3	22	*	*
External user	6	2	63	3	9	23	*	*
Outgoing loans								
Smithsonian affiliates	1	54	37	1	2	*	6	*
Other organizations	4	15	55	3	1	26	*	1
Incoming loans (non-exhibition)	2	4	73	6	2	15	*	
Packing and shipping	1	*	99	1	*	*	*	*
Logistical support — reorganize and move collections	1	12	71	9	8	*	*	*
Public programs and education support	4	1	64	9	12	2	2	11
Exhibition support requirements	3	6	87	1	4	1	*	1
Central reporting	2	4	67	5	22	1	*	*
Digitizing collections	*	9	*	16	*	*	75	*
Web development	*	*	6	15	*	*	*	79
Data management	1	*	77	*	18	5	*	*
Training	1	4	83	9	1	4	*	*
Other	*	8	80	3	9	*	*	*
Total	100							

*Source:* Office of Policy and Analysis FY2000 survey.

*Note:* NMNH used some categories that were considerably more detailed than those in the OP&A survey. For example, NMNH broke out four categories for the single OP&A survey category of “collections development”: scholarly research; acquisitions; deaccessions/disposals; and repatriation. Likewise, for the OP&A survey category of “ongoing care and documentation,” NMNH used preservation/conservation; storage; routine collections care; accountability and inventory control; and research for records enhancement.

\*Less than 1 percent.



## collections space

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Both the responses to the OP&A FY2000 survey and comments by interviewees indicated that storage space was a major challenge for Smithsonian units, in terms of both availability and quality. This section reviews the quality and extent of existing space, and the options facing the Smithsonian for responding to problems and challenges in this area — including a discussion of the relative costs of leasing space versus constructing new facilities. It then turns to the question of space needs.

### current collections space: an overview

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An inventory of Smithsonian space use, prepared in September 2000,<sup>39</sup> determined that nearly 1.7 million sq ft of space were used for collections storage Institution-wide, or about 2 percent of all assignable Smithsonian space.<sup>40</sup> Of this space, libraries used 135,294 sq ft and archives 29,544 sq ft. An additional 145,743 sq ft were used for collections research, processing, and examination. The total space used for collections storage increased by 59 percent between the inventory years of 1991 and 2000, an average annual increase of 6 percent. That increase occurred in spurts as new facilities opened, such as NMAI's CRC, with its 97,000 sq ft of collections storage.

Respondents to the OP&A FY2000 collections survey claimed that much of the total storage space was of lower than desirable quality, although new facilities were built to state-of-the-art standards. In fact, the percentages of space considered “optimal” and “below acceptable” by respondents were approximately the same (Figure 10).<sup>41</sup>

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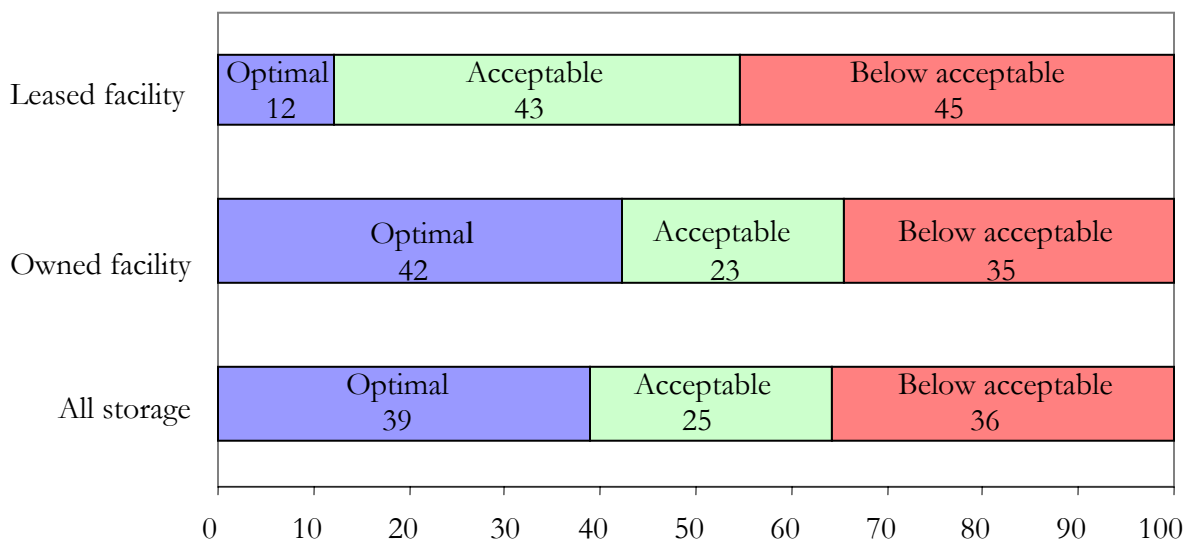
<sup>39</sup> The 2000 inventory was an update by OFEO of an earlier inventory conducted by HOK Architects in 1991 (Smithsonian Institution, Office of Facilities Engineering and Operations, Office of Facilities Services 2000).

<sup>40</sup> In OFEO usage, “assignable space” is usable space, as contrasted with gross square footage.

<sup>41</sup> Quality categorizations were at the discretion of responding units.

Respondents considered leased space significantly less acceptable from the standpoint of quality than facilities owned by the Smithsonian; according to survey respondents, more than two fifths of leased space was below an acceptable level of quality. Museums, archives, and libraries reported nearly identical conditions. (Appendix G provides further information on the variations across units in owned and leased space.) Despite the apparent inferiority of leased space, the amount of such space increased from less than 100,000 sq ft to more than 431,000 sq ft between FY1991 and FY2000.<sup>42</sup>

**Figure 10. Quality of Smithsonian Collections Storage, FY2000**  
(percent)



Source: OP&A FY2000 survey.

According to responses to both OP&A surveys, the quality of collections storage space improved between FY1991 and FY2000 and is continuing to improve. For example, in FY2000, NASM reported that two thirds of its storage space were below acceptable. With the opening of the UHC at Dulles and the transfer of collections

<sup>42</sup> The leased space includes 34,564 sq ft for collections and 6,224 sq ft for archives at SAO, which is not an officially designated collecting unit.

there, almost all NASM collections storage was at least acceptable. Likewise, the move of NMAI collections from the Bronx to Suitland and the new Mall museum will reduce the percentage of the museum's collections stored in below-acceptable conditions.

The other general collections space issue confronting some Smithsonian units was a shortage of space, given current needs and constantly growing collections. Faced with the prospect of insufficient storage space, units identified two general responses: storing items more densely in existing facilities, or augmenting the storage facilities themselves. (Units responding to the OP&A survey also identified a number of *ad hoc* ways in which they accommodated objects, such as putting collections in offices and hallways; stacking cases higher than desirable; leasing space away from their main facilities; and leaving undifferentiated collection lots unprocessed. All of these solutions were viewed as temporary fixes until adequate storage could be found.)

A few Smithsonian museums were addressing some of their need for more space through collaborative arrangements with other museums, both inside and outside the Institution. For example, NMAH had a collaborative storage agreement with the National Museum of Industrial History in Bethlehem, Pennsylvania, that eased the burden of storing some very large objects. The Offsite Enhancement Program at NMNH is a model of a collaborative arrangement that benefits all parties in numerous ways, one of which is the reduction of storage space needs. Another tactic has been to use open storage space. As noted, shifting NASM's collections from Garber to UHC makes them accessible to the public and to researchers with minimal demands on staff time, while also reducing the need for space to store more than three quarters of NASM's collections. The downside is that because open storage requires more space to accommodate public access, it is more expensive.

Alternatively, storing items more densely — using compact storage — can mitigate the need to invest in new construction or leased space, with the associated maintenance costs. Unfortunately, there is a catch: interviewees generally equated

denser storage with decreased ease of access and increased access costs, because of the time required to locate and procure objects. Therefore, there is a tradeoff between the cost of the labor required to access collections and the cost of the storage space. As one goes down, the other tends to go up. However, the OP&A study team does not have robust estimates of the precise tradeoff.

The advantages and disadvantages of augmenting storage facilities are a mirror image of those associated with increasing the density of storage: more space eases access, but at the cost of construction/leasing and maintenance of additional space. Perhaps the clearest recent example of this tradeoff is UHC. UHC made NASM's collections far more accessible to the public and researchers, and providing that access requires less staff time, but the facility carries an estimated price tag of over \$300 million.

The two approaches — compacting collections and increasing the amount of storage space — can be complementary, and indeed must be over the long term, as compacting can only go so far. For example, in June 2003, Sears and Russell Consultants conducted a study of NMNH space requirements and utilization at the Mall NHB through 2023. Focusing only on storage space, Sears and Russell projected that, with expected growth, NMNH's collections would require 456,863 sq ft if stored in acceptable conditions in noncompacted storage. If the dry collections, which currently occupy 350,694 sq ft, were stored in dense, compact storage (the “wet” collections cannot be compacted), the space needed for these collections would be 232,383 sq ft. Thus, compacting collections can reduce storage needs by one third or more, a figure that has been replicated in British museums.

### **the costs of storing collections**

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Several authors have attempted to estimate the per-item cost of maintaining collections in storage or on display. For example, in 1983, architect George Hartman applied architectural algorithms to art museums to address this issue (Bank 1988).

Hartman estimated that the average stored object required 2 sq ft of floor space and cost \$120 per year to house. An object on display used more space — according to Hartman, 50 sq ft — and cost \$3,000 per year to house. Based on these figures, the present discounted value of the costs associated with a stored object was approximately \$2,400 over the 30-year life span of a storage facility, and the expenditures on a displayed object had a 30-year present discounted value of approximately \$60,000.<sup>43</sup>

Lord, Lord, and Nicks (1989) provides the results of a similar exercise carried out to estimate the costs of holding collections in the United Kingdom. Lord, Lord, and Nicks tallied all curatorial expenses (curatorial programs, documentation, conservation, research, and stock-taking) and security expenses — together comprising 38 percent of UK museum expenses — and added in estimates of collections' share of indirect museum costs. Their estimate that collections accounted for 66 percent of total museum expenses results in projected operating costs for collections of £120 per square meter (including but not limited to collections storage space).

The OP&A study team examined Hartman's algorithms but was unable to develop a comparable algorithm to apply across Smithsonian's collections, for several reasons. One difficulty is that it is impossible to identify the exact number of objects in Smithsonian collections with complete accuracy, since not all collections are inventoried, and some types of items are inherently difficult to enumerate: collections documented as lots rather than individual objects; study, research, and education collections not reported to NCP; collections held by units that are not officially designated collecting units; and loans and items temporarily deposited with Smithsonian units. Another problem is that it is impossible to talk about the space occupied by an "average" Smithsonian object, because of the staggering diversity of

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<sup>43</sup> Present discounted value refers to total life-cycle costs expressed in current dollars — that is, with expenditures projected for the future and adjusted to reflect changes in prices. In this case, the calculation assumes a 3 percent annual increase in operating costs and a 6 percent annual deflator for the value of money. It is standard to assume a life-cycle of 30 years when calculating the present discounted value of the costs of operating a new collections storage facility.

the Institution's collections. Is each of SAO's electronic Chandra images comparable to NASM's space shuttle? Do beetles and whales count as equivalent items at NMNH? Do NZP animals used as food for other animals count the same as the zoo's lions and giant pandas? A final complication is that even for collections of a given size and description, space requirements can be somewhat flexible. For example, NASM's UHC is a 700,000 sq ft facility, yet the vast majority of the collections on display there were moved from Garber, which has only slightly more than 200,000 sq ft of storage space. Such indeterminacy can be traced to a number of factors. A portion of each museum's collections are displayed in exhibitions, and the percentage on display at any given time — which varies among museums in different disciplines and with different missions — affects space requirements. Collections storage space needs also vary on the basis of factors such as the percentage of collections on loan, the extent to which open storage arrangements are used, and how many items are sitting in researchers' offices and labs at a given time.

A large part of the costs of housing Smithsonian collections is the construction or leasing of facilities. A useful source of information on these costs is a detailed assessment done in 1997 by the architectural firm of Hayes, Seay, Mattern and Mattern (HSM&M) (HSM&M 1997). The firm developed the 30-year life-cycle costs associated with four options:<sup>44</sup> (1) building a 450,000-gross sq ft history and art collections building at the Smithsonian's Suitland facility; (2) acquiring and remodeling an existing building in the Washington, DC metropolitan area; (3) leasing a building; and (4) leasing a building with a purchase option. The Suitland facility was never authorized, but the detailed projection of costs provides an interesting glimpse of the application of standard private-sector real estate facility costing models to this important question.

HSM&M's analysis is presented in Table 12.<sup>45</sup> Discussions of new facilities tend to focus on construction costs, but as Table 12 demonstrates, these are only one part of

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<sup>44</sup> HSM&M used OMB figures for escalators and deflators for the out-years.

<sup>45</sup> According to the Bureau of Labor Statistics inflation calculator ([www.bls.gov](http://www.bls.gov)), \$1 in 1997 is equivalent to \$1.15 in 2003, due to inflation.

the expenditures associated with such facilities. Even before construction, there are real estate and design costs. After construction, a new facility incurs costs for ongoing maintenance; periodic renovations; heating, electricity, and other utilities; and security. And there are costs associated with moving collections into the building and working with the relocated collections to conserve them and provide access.<sup>46</sup> Thus, the standard private sector models bring in both initial construction costs and downstream maintenance and management costs. Table 12 shows that the cost of actual construction is less than half of the total 30-year cost of a new collections facility.

The table suggests that the projected 30-year life-cycle costs are substantially higher for leased facilities than for new or remodeled ones. However, leasing does provide greater operational flexibility. For example, the Smithsonian can pay lease costs out of operating revenues, including federal appropriations, whereas to undertake capital expenditures, it must get authorization from the Congress, even if only trust funds are involved. In addition, the conventional wisdom among museum professionals is that it is difficult to raise private philanthropic funds for collections management. Thus, since leasing does not involve the high upfront costs associated with constructing a new facility, it can appear to be a more practical option. However, it can be argued that the choice is really between paying now or paying later, since ultimately the lessee pays for the construction costs over time as part of the lease.

## collections space needs

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Based upon the cost figures calculated by HSM&M for the art/history collections storage facility described above, the OP&A study team projected the approximate cost of responding to current shortfalls in Smithsonian collections storage space.

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<sup>46</sup> Conservation and access charges apply almost equally to all new facilities, leased or owned, except for differences in factors such as travel. If a facility is being built to replace an existing facility, rather than to accommodate collections growth, then the conservation, access, and maintenance costs are applicable to the existing facility as well.

**Table 12. Present Value of Total 30-year Life-cycle Expenses  
for a 450,000 Gross Square Foot Collections Management Facility  
(1997 dollars, '000)**

Cost elements	Build on Smithsonian property	Acquire/remodel estimate		Lease		Lease w/ purchase option estimate	
		(Low)	(High)	(Low)	(High)	(Low)	(High)
Building & land acquisition	0	16,761	49,457	0	0	137,387 <sup>a</sup>	188,881 <sup>a</sup>
Planning & programming	100	100	100	100	100	100	100
Design	7,756	4,886	4,886	0	0	0	0
Construction	81,438	51,308	51,308	0	0	0	0
Equipping & furnishing	13,259	13,831	13,831	13,831	13,831	13,831	13,831
Move-in & occupancy	1,496	1,496	1,496	1,496	1,496	1,496	1,496
First-year program expense <sup>b</sup>	912	1,131	1,131	1,131	1,131	1,131	1,131
Total annual operating expense <sup>c</sup>	6,785	7,858	7,858	16,518	19,764	16,518	19,764
Total 30-year major repairs <sup>d</sup>	58,816	27,806	34,018	27,806	34,018	27,806	34,018
30-year net present cost	167,182	176,005	205,992	220,588	261,34	215,3434	254,130

*Source:* Hayes, Seay, Mattern, and Mattern, Inc. (1997).

a. Assumes the previously-leased facility is purchased by the Smithsonian in 2013.

b. Repeated every 10 years.

c. Repeated annually.

d. Fiscal years of expenditures are 2007, 2012, 2017, 2022, and 2027.



Ideally, this would involve replacing all currently leased storage with Smithsonian-owned space; replacing all storage space identified as below-acceptable quality in the OP&A survey with space of acceptable quality; and providing for the projected short- and long-term needs of Smithsonian units as stated in the FY2000 OFEO survey (approximately 900,000 sq ft).

If all this were done, the total cost of planning, designing, constructing, equipping, furnishing, and moving into new facilities would be approximately \$303 million (in 2003 dollars), with total operating expenses over 30 years of \$20 million (in 2003 dollars). When major repairs and renovations over a 30-year life cycle are added, the present discounted value of the 30-year life-cycle costs of building and operating the required new storage space on Smithsonian-owned land would be approximately \$486 million, in 2003 dollars. This figure can be broken down as follows:

- \$46 million to replace leased storage space (86,000 sq ft)
- \$153 million to eliminate below-acceptable Smithsonian-owned storage space (288,000 sq ft)
- \$26 million to meet the immediate needs mentioned in the OP&A collections survey (49,000 sq ft)
- \$232 million to meet additional projected short-term storage needs (436,000 sq ft)
- \$29 million to meet additional projected long-term storage needs (55,000 sq ft).

If comparable space were leased without an option to purchase, the present value of the 30-year life-cycle costs would be between \$709 million and \$839 million in 2003 dollars.<sup>47</sup>

However, a single type of storage facility does not fit all collections needs. For example, archives using compact storage may require a facility with floors that support loads of 300 pounds per square foot, while normal warehouses have much lower loading capacities. An art museum with contemporary art may require 12-foot ceilings and comparably large elevators. NMNH requires special safety measures in the storage area for alcohol collections. Some units may require cold storage to kill pests and prevent deterioration; others may require certain humidity conditions to slow the deterioration of certain objects.

The preceding analysis does not consider special requirements, which generally would increase the projected shortfall. The figures given above should therefore be considered conservative. Table 13 shows types of the exceptional storage needs and the space used for those needs that Smithsonian collecting units reported in the OP&A FY2000 survey. Of the 900,000 sq ft used for exceptional storage requirements by museums and archives in FY2000, the greatest share was used for oversized objects: approximately 400,000 sq ft. Over 200,000 sq ft were used for objects requiring special temperature controls, and slightly less than 200,000 sq ft for flammable (alcohol) collections.

As an example of the cost of exceptional storage for illustrative purposes, replacing the below-acceptable temperature-controlled cold storage reported in the OP&A FY2000 survey would entail construction costs of roughly \$1.5 million, assuming a cost of \$275 per square foot.<sup>48</sup> OFEO has determined that an additional 6,700 sq ft of this type of space will be needed by FY2010, at an additional cost of \$1.8 million.

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<sup>47</sup> The present value cost using HSM&M projections in 1993 dollars would be between \$558 million and \$661 million. These figures have been adjusted to 2003 dollars using the Bureau of Labor Statistics inflation calculator.

<sup>48</sup> Some types of exceptional storage space are more expensive to build than cold storage, and some are less; OP&A does not have estimates for all types (communication from the OFEO Real Estate Department, 2003).

More generally, to upgrade all currently below-acceptable exceptional storage to an acceptable level would require more than \$140 million in construction costs, with a 30-year life cycle cost exceeding \$225 million.<sup>49</sup>

**Table 13. Exceptional Storage Requirements and Quality of Space, FY2000**

Described needs	Archives and libraries					Museums				
	Total space able (sq ft)	Opti- mal (%)	Accept- able (%)	Below accept- able (%)	Not accept- able (%)	Total space (sq ft)	Opti- mal (%)	Accept- able (%)	Below accept- able (%)	Not accept- able (%)
Anoxic	0	n.a.	n.a.	n.a.	n.a.	500	100	0	0	0
Aquaria, terraria, and exhibit cases for living cols.	0	n.a.	n.a.	n.a.	n.a.	12,714	0	32	64	4
Asbestos contamination	0	n.a.	n.a.	n.a.	n.a.	598	0	100	0	0
Flammable liquids	0	n.a.	n.a.	n.a.	n.a.	184,563	1	0	99	0
Growth chamber	0	n.a.	n.a.	n.a.	n.a.	95	0	100	0	0
Hazard protection	350	0	0	71	29	20	0	75	25	0
High security vault	310	0	52	16	32	16,215	39	60	1	0
Human remains vault	0	n.a.	n.a.	n.a.	n.a.	150	0	0	100	0
Light-sensitivity	1,174	26	65	0	9	12,329	80	19	2	0
Oversize/heavy object	36	0	100	0	0	397,738	15	15	70	0
Oversized storage	0	n.a.	n.a.	n.a.	n.a.	31,048	58	0	42	0
Radioactive	0	n.a.	n.a.	n.a.	n.a.	2,506	0	100	0	0
Repatriation vault	0	n.a.	n.a.	n.a.	n.a.	112	0	100	0	0
Unusual temp. or RH control	9,348	48	30	11	11	208,496	7	91	2	0
Vault for film and videotape	750	0	17	83	0	0	n.a.	n.a.	n.a.	n.a.
Other	3,433	23	15	62	0	13,656	69	31	0	0

*Source:* OP&A FY2000 survey.

n.a. Not available.

<sup>49</sup> These estimates are conservative, since they are based on the HSM&M costs for constructing general storage space, which is less costly than special-needs storage space.

At the time the research for this study was being completed (and well after the OP&A FY2000 survey), funds were obligated to begin planning the construction of Pod 5 at MSC. In addition, A&I is to be mothballed sometime in FY2005, which has precipitated crisis discussions of where to house the staff, activities, and collections (belonging largely to SIA) that reside there. At this point, the Smithsonian is assessing various options.

One interviewee commented on the overall approach to collections space planning at the Smithsonian, particularly in light of the current crisis precipitated by A&I's closure: "Collections space planning, in fact all space planning at the Smithsonian, is crisis-driven." The last major master plan that considered collections storage from an Institution-wide perspective was the Suitland master plan in 1994. In the late 1970s, Smithsonian management had decided that the Smithsonian needed to forecast collections growth and storage needs for 30 years, which led to the initial Suitland Master Plan and the construction of MSC, which opened in 1983. However, the Smithsonian never fully implemented the original master plan. Subsequent interim master plans for Suitland have focused on MSC and the space to be emptied by NASM at the adjacent Garber Silver Hill facility.

Interviewees described a culture inimical to Institution-wide facilities planning. Each collecting unit has tended to consider its collections storage separately, without attention to shared facilities. Absent one central locus for effective coordination and planning at the Smithsonian, interviewees complained that the storage space numbers changed constantly as directors changed their minds about needs. The situation was compounded by a lack within OFEO — or any other Smithsonian agency — of a capacity to independently validate units' estimates of the extent and cost of space they need. Further, interviewees told of museums occupying leased storage space of which OFEO was unaware, and also noted that there was no central enforcement mechanism controlling space leases. They described a process for space planning that was not proactive or rationalized for the Institution as a whole. Instead, decisions were made in response to near-term crises at individual units. The OP&A study team found no examples of strong central leadership in making or

rationalizing collections space planning and construction from the perspective of overall Institutional needs.

## equipment and supplies

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As shown in Table 14, a number of the Smithsonian collecting units that responded to the OP&A FY2000 survey thought that the condition of collections equipment and supplies could be improved. Museums indicated that about one fifth of both equipment and supplies was below acceptable quality. Archives and libraries indicated similar issues with supplies, but their equipment was in slightly better shape.

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**Table 14. Condition of Collections Equipment and Supplies,  
Smithsonian Museums and Archives/Libraries, FY2000  
(percent)**

	Equipment			Supplies		
	Optimal	Below acceptable	Acceptable	Optimal	Below acceptable	Acceptable
Museums	37	42	21	34	48	18
Archives/libraries	32	56	13	51	28	22

*Source:* OP&A FY2000 survey.

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Verbatim responses of units to the OP&A survey illustrated what they meant by “below acceptable.” One museum reported:

Problems primarily stem from our inheriting (1) past storage systems and (2) past practices for storing and housing collections that are now known to be damaging or inappropriate. . . . Equipment/housing supplies are made of unstable materials that contribute to the deterioration of the objects stored in them or adjacent to them (e.g., . . . PVC or other unstable plastic folders and sleeves); or contain structural features that physically damage or jeopardize objects (e.g., storage units with protruding metal components).

In a similar vein, another museum noted that storage equipment within its facility was not optimal, even though the building generally was:

Our main problem is with the compacting storage units installed. . . . The units are 12 feet tall, making access to at least half of the collection difficult without the use of scissor lifts or man lifts. In addition, the units are unreliable electronically and often refuse to move. . . . A critical issue with the units is the lack of local maintenance/repair support. The nearest repair company is outside of Philadelphia; however this company often cannot fix the units, and we are forced to call in the manufacturer (in Quebec, Canada) to have the units repaired.

A third museum identified a different set of equipment problems (since corrected), involving

. . . Temperature and humidity control equipment for art storage, flight material, and tire and rubber storage. . . . Wood crates: they tend to maintain high relative humidity inside that promotes corrosion and paint loss. This has been verified through testing. The wood also emits tannic acid, acetic acid, and formic acid that promote deterioration. They can become habitats for mice and certain insects. They are flammable, and it is difficult to access an artifact for research, examination, or inventory.

## information technology

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Collecting units have been making increasing use of information technology to facilitate and improve collections management. Chapter 3 reviewed ongoing work with electronic CISs and digitization and discussed other technologies relevant to collections management. Investment in information technology is generally expensive. By far the greatest cost is the labor required to use and maintain it, but the technology can carry significant upfront costs for installation of hardware and software. This section addresses primarily the nonlabor cost aspects of information technology.

All museums except one (NMAH) have already implemented, or are in the process of implementing, a central electronic CIS system. Thus, the up-front costs of the technology itself and its installation have already been covered. However, the lifetime of a CIS is about five years, at which point new costs arise as a unit is compelled to upgrade its existing system, or shift to another one. For example, according to an interviewee, ArtCIS, the committee set up by the art museums to coordinate their use of TMS, was to meet in 2004 to consider upgrading or perhaps moving to a different CIS. However, it is true that the costs of particular technologies tend to decrease as the use of these technologies spreads. For example, as noted, in 2000, radio frequency identification tags (RFID) cost \$1 each (Niemeyer, et al. 2003), and the cost has already dropped to 25 to 40 cents; in a few years, tags are expected to cost no more than 5 cents.

## CONCLUSIONS

The OP&A study team identified a number of specific areas where a lack of resources is having detrimental effects on the care and management of collections. These are discussed in this concluding section.

## finances

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Although the Smithsonian spends more on collections care than on other programmatic activities except research, at many units funds still fall short of what is required, given the size and nature of their collections. It is highly unlikely that the Congress alone will provide all of the required additional funds for ongoing collections management, or even for priority tasks such as completing inventories. Thus, additional funding will need to come from the private sector. The OP&A study team believes that neither the central administration nor the individual units have undertaken sufficient efforts to generate philanthropic funds for collections management (other than for acquisitions), and that it is indeed possible to raise substantially more money for this purpose. If the Smithsonian were to increase the trust funds available for collections management to the point where they accounted for half of all collections expenditures — about the same share as for education and exhibitions — this would mean an additional \$39 million for collections-related needs, a 58 percent increase.

Further, if the Smithsonian calls for a major one-time refinement of collections to bring them into alignment with missions, programs, and resources, it is possible that some of the items will have sufficient value to justify disposal by sale. In the case of the non-art museums, which are not subject to the AAMD code of ethics, the possibility of a sale warrants exploring use of the interest, but not the principal, from a restricted endowment account for collections care, particularly for critical projects such as eliminating processing backlogs. (For a further discussion of this issue, see Chapter 5.)

Finally, the extent to which cost recovery — that is, charging fees to users of collections-related services — might generate an income stream for collecting units has not been well-studied. While lending is a seemingly logical area in which to recover costs, collecting units are reluctant to charge fees other than those required



to cover direct expenses, because they benefit from a *quid pro quo* when they borrow. Fees for services such as photographing artifacts or copying documents are more common, but the potential for generating significant revenue through such fees is not clear. (At the Smithsonian, fees for similar services vary significantly across units, leading to confusion and perceptions of arbitrariness and inequity. This raises the question of whether there should be an Institution-wide policy on collections-related fees.)

## human resources

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The most important resource concern identified by the OP&A study team is the steep decline in the number of collections management (especially collections care) FTEs that some units have experienced in the face of steady or growing workloads. Lower job grade collections care personnel account for most of the decline.

These cutbacks have forced remaining staff to scramble to stay on top of their primary work, and to take on as collateral duties many of the responsibilities of staff who have left. Staff morale has been negatively affected. In some cases, important activities such as processing outgoing loans, providing onsite access to collections for visiting researchers, and addressing backlogs in documentation cannot be undertaken in timely fashion, if at all. At the units that have suffered the steepest declines, such as NMNH and NMAH, the results have been dramatic. NMAH, for example, is contemplating whether to mothball its new CIS for want of staff to implement it.

One response has been for remaining staff to simply work harder, but the OP&A study team believes day-to-day workloads, let alone accumulated work that has remained undone for many years, may be reaching unsustainable levels for many personnel. There are only two broad options for addressing this problem in the long run: increasing human resources (employees, contract staff, and volunteers); or

reducing workloads (with implications for paring collections, providing fewer services to users, or accepting lower standards of collections care). Given the importance of the Smithsonian's collections to the nation and its obligation to protect them and make them accessible, the former course is clearly preferable. Rebuilding human resources in the collections management area needs to be a high short-run priority for the Institution.

The OP&A study team estimates that Smithsonian collecting units have an immediate need for approximately 100 additional full-time equivalent (FTE) collections care staff (both employees and contract staff, as needed), at an annual cost of approximately \$4.0 million,<sup>50</sup> to bring collections up to an appropriate standard of care. By FY2010, the units will need approximately 65 additional FTEs, at an annual cost of approximately \$2.6 million (2003 dollars).

These numbers are based primarily upon the needs stated by the units themselves on the OP&A collections survey, as discussed in the findings. While some caution is in order with regard to such self-generated estimates, the OP&A study team concluded that a figure derived from the needs expressed on the survey was reasonable, and most likely even conservative. One important reason for this is that the large unit with the greatest collections care concerns — NMAH — did not respond to the OP&A survey, which means that any figure derived from the other units' responses is likely to be low relative to actual Institution-wide staffing needs. Further, the recommended staffing increases would raise FY2010 collections care staff levels only slightly above FY1994 levels Institution-wide, and collections have grown since then. In fact, in the cases of NMNH and NMAH, basing personnel increases on the survey data would leave collections care staff levels well *below* their FY994 levels. The team has therefore chosen to round the expressed needs figures up to 100 personnel immediately and 65 by FY2010.

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<sup>50</sup> The cost estimate is based on the assumption that the average new FTE will have a salary of \$29,894 with 30 percent benefits, and will use \$800 worth of equipment and supplies per year. The salary calculation assumes that 60 percent of new employees will be grades GS 5-7, 30 percent will be GS 8-10, and 10 percent will be GS 11-13. *Source:* Smithsonian Institution Committee on Compensation and Human Resources, *The Smithsonian Workforce: Challenges for the 21<sup>st</sup> Century*, n.d.

Some of the priority collections management projects discussed in this study — such as completing basic inventories, profiling collections, and completing basic CISs — may require additional research and IT personnel as well. (Some increases in IT staff for CIS improvements have already been planned.) In some cases, reassigning existing staff to these tasks may suffice. In others, it may be appropriate to hire contract staff, because of the once-off nature of the task.

Lending is a priority of the central administration, but it is a labor-intensive one that has been affected by the staff shortages at a number of units, where overstretched staff are often unable to keep up with loan requests. Affiliate loans are a particular concern because of the additional time, effort, and resources many of them require. The goal of getting more of the Smithsonian's objects out into America's museums and communities is certainly a worthy one, but it is reasonable to question whether the goal can be effectively pursued without additional personnel. Indeed, the OP&A study team questions whether doing so is a more important short-term priority than attending to priority collections management tasks such as those mentioned above.

Not only do several Smithsonian units have an immediate need for more collections management personnel, but the required skill sets are changing as technology progresses. The Smithsonian has generally not offered formal training for collections staff in database management and other new skills that are rapidly becoming part of the collections management profession. In addition, the quality and productivity of collections management work would benefit from formal on-the-job training in a variety of skills for younger, less experienced staff, especially as senior personnel retire and opportunities for informal mentoring become more limited. Formal training, rather than the current informal, on-the-job training, would better prepare staff for the more diffuse responsibilities that come with the blurring of roles now characteristic of collections management jobs. Moreover, formal training is increasingly important as units lose many of their experienced, long-time staff and is consistent with the increasing professionalization of collections management.

The federal personnel categorization and grading system for collections care positions limit the degree of professionalization of collections care positions at the Smithsonian, as well as the opportunities for pay raises and promotion within the collections care area. That system needs to be brought into alignment with the growing professionalization of this area of work, not least to support retention of experienced collections care staff. Systems such as broadbanding, which has met with general approval by affected workforces, might contribute to retention by providing more room for promotion. Broadbanding and creating new job classifications for collections management or care would be, however, a major change in the Smithsonian personnel system and would require legislation to exempt the Smithsonian from Title 5 of the Code of Federal Regulations covering the federal personnel system. It would require that the Smithsonian accept full responsibility for personnel management, rather than working under Office of Personnel Management regulations.

In sum, there are serious grounds for concern about the adequacy of the human resources devoted to collections management at several collecting units, particularly in the areas of basic collections care and access as envisioned in the Smithsonian's strategic plan. Staff cutbacks have led to morale problems, affected efficiency as hands-on care must increasingly be performed by high-level personnel, and contributed to a loss of vitality as fewer new staff familiar with the latest techniques and technologies have come into the Smithsonian workforce. The situation is most acute at NMAH and NMNH, where the slow attrition of collections staff may be reaching a critical point where remaining staff can only carry out basic responsibilities through extraordinary efforts — a situation that can leave important activities undone and that is, in any case, unsustainable and inequitable. Addressing the situation will require a reduction in voluntary separation of personnel from collections care positions, which in turn requires improving the professional status of collections care workers. Unavoidably, it will also require the hiring of additional personnel.

## storage space

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It is clear from both the OP&A surveys and from the studies conducted by OFEO that many collecting units were experiencing problems with respect to storage space. At some units, poor storage conditions placed holdings at risk. At others, the main issue was that the extent of available storage space was insufficient to accommodate current collections or foreseeable growth. At still others, the unsuitability of leased space was a major issue. The OP&A study team finds it troublesome that one third of the Smithsonian's storage space would be rated as below acceptable quality by the units. The extent of the problem, however, varied significantly across the units.

The situation had clearly improved for some units by the time the OP&A study team was concluding its research for this study. For example, the move of NASM collections from Garber to the UHC had remedied most of NASM's immediate storage problems. In addition, the Smithsonian was considering several near-term options intended to accommodate current needs.<sup>51</sup> If these options materialize, the most pressing immediate concerns with storage space would be resolved. However, the OP&A study team questions whether these options would have been the most desirable choices in the context of a long-term plan, rather than crisis planning. The prospects for accommodating future collections growth remain uncertain.

One option not currently under consideration deserves attention. The OP&A study team believes there is sufficient indication that an interagency natural history facility at the USDA/ARS property in Beltsville would yield significant benefits, and deserves further study. Such a facility — which has been under discussion for decades within the federal natural history collecting community — would provide both state-of-the-art research space and consolidated storage for currently dispersed

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<sup>51</sup> For example, several facilities were under consideration for purchase, including Artex (currently leased for storage by SAAM) and a facility at 225 Virginia Avenue, SW. Another option under consideration was modifying the utilization patterns at MSC in conjunction with the construction of Pod 5.

NMNH collections in close proximity to the researchers making use of these collections. Pursuing this option would be one way to address long-term space needs in a rational manner. The quality and quantity of scientific space in this proposed facility would far exceed what is possible in the Smithsonian's NHB and Suitland facilities, even with the proposed renovations to the former and the addition of Pod 5 to the latter. (In particular, the configuration and national landmark status of the NHB preclude, or render prohibitively expensive, some highly desirable upgrades of collections and research space there.) Further, such a facility would free up quality storage space at Suitland that could be used to serve the needs of other Smithsonian units. The benefits and challenges of this option are explored in more detail in Appendix E.

In general, long-term storage needs can be met in three ways:

- Continued improvements in the efficiency with which existing space is used (such as compact shelving);
- Acquisition of additional space (through construction, purchase, or leasing); or
- Management of acquisitions and disposals so space requirements of collections grow at a manageable rate.

All three of these strategies will surely figure in any long-term plan for collections storage. However, it should be stressed that the OP&A study team does not consider leasing to be a desirable long-term solution. Unfortunately, when leasing is used as a short-term fix — which often happens, owing to budgetary realities — the leases tend to stretch into the longer term. Not only does evidence suggest that leased facilities are typically the most costly option when considered over a 30-year life cycle, but leased space is usually of lower quality than Smithsonian-owned space, even after costly upgrades. The OP&A study team realizes that new construction is made difficult by the need to secure upfront funds and congressional approval, and

those considerations often have made leasing a more practical option. Nevertheless, the study team questions the wisdom of allowing the flow of funds to drive long-term storage space decisions. The Smithsonian needs to make a business case to the Congress and donors for the long-term cost-effectiveness of constructing new storage facilities.

To sum up, the OP&A study team identified several important issues that have contributed to problems with storage space at the Smithsonian. First, collections management is an inherently long-term function. Yet the study team found that, too often, decisions about storage space were deferred until a foreseeable need had become a crisis, which greatly narrowed the options and raised the costs of addressing this need. In short, decisions were often driven by crises, not long-term plans. Second, there is a need for more long-term, proactive, Institution-wide planning of storage space that allows priorities to be set, common interests to be identified, multiple options to be considered, and timely, cost-effective solutions to be found. There is currently no office or mechanism within the central administration that systematically views storage facilities from an Institution-wide perspective, assesses costs and needs across the entire system (as well as at individual units), or promotes efficient, shared solutions to issues that transcend individual units. In the absence of such a Smithsonian-wide context, it appeared to the OP&A study team that OFEO works principally in response to the concerns of individual collecting units. Without greater focus and systematic central direction, the Smithsonian will not be able to present a convincing business case for storage space to the Congress and donors. Storage space issues must be given greater prominence, because as long as the Smithsonian continues to collect, there will be a need for more storage space.

## information technology, supplies, and equipment

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Smithsonian collecting units recognize the importance of information technology in caring for their collections and making them accessible. Many have made commendable progress in developing their electronic CISs and integrating at least basic records for their collections, such that they are able to provide at least basic information on most of their holdings, as well as a considerable number of enhanced records. Others, however, have been struggling to implement computerized CISs. Realizing that an electronic CIS with basic documentation on a unit's collections is an underpinning of good collections management and access, the completion of basic CISs needs to be a high priority of the central administration, working in conjunction with the units.

The OP&A study team acknowledges major advances at the Smithsonian in coordinating and rationalizing investment in information technology as a result of the establishment of OCIO as a central unit and the preparation of the Smithsonian Information Technology Plan for FY2002–FY2007. The study team believes that this plan will identify and address major IT concerns.

Finally, while supplies and equipment pose problems for some units in fulfilling collections management responsibilities, these problems are idiosyncratic rather than general, and are solvable at the unit or Under Secretary level.