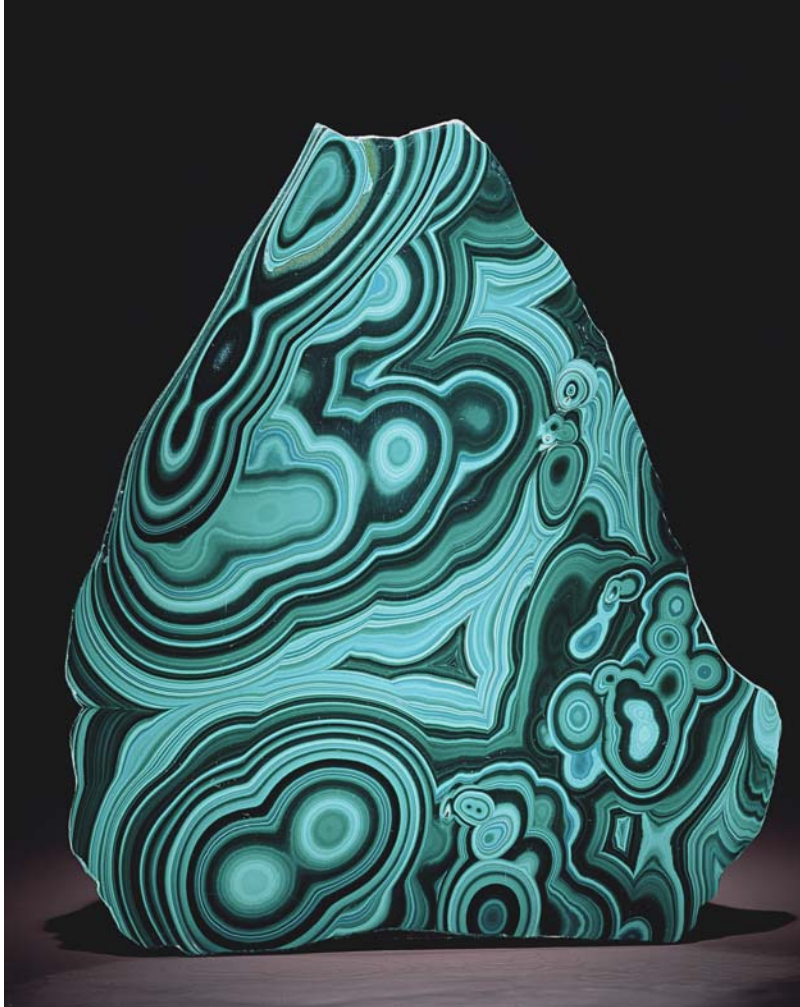


COLLECTIONS USE AND ACCESS



This chapter addresses how collections are used, who uses them, and how that use can be facilitated. The discussion touches on the tensions inherent in different types of uses and the obstacles to access that the collecting units identified.

Electronic access to collections receives particular attention not only because of its potential to provide more widespread and in-depth use of collections, but also because of the significant challenges faced in exploiting that potential. Drawing on the key findings, the conclusions identify the principal issues with which the Smithsonian, collectively and at the unit level, must grapple in expanding and facilitating access.

FINDINGS

uses of collections

There are four principal ways that collections are used: (1) display, (2) research and reference, (3) education and interaction, and (4) symbolism. These four uses have long histories among the collections at the Smithsonian. Their relative importance has varied considerably depending on the individual collecting unit. Although the uses generally complement and support one another, there is some inherent tension among them.

display

Display involves a direct experience of the public with collections — through exhibitions, programs, open storage, open conservation labs, or visits to closed storage — at the unit or another location.

Interviewees spoke of the value of direct encounter with the collections in terms of a museum's mission and the importance of seeing “the real thing.” As an interviewee said about the Zoo,

You can see animals on television, but that is nothing compared to having the animal right there in front of you — to smell a gorilla, to see just how big an elephant really is, to see a giraffe's tongue up close. There are many who would never be able to see these things in the wild . . . It's important for people to see the animals so they develop an appreciation for them. With that comes a sense (sometimes) that we need to work or spend money to save these magnificent animals.

Exhibitions and collections are tied to one another, and this relationship has had an impact on collections work, as collections staff have frequently become part of the exhibition process. As the emphasis on exhibitions has increased, collections personnel increasingly divide their time between exhibitions-related work and other activities, such as collections care and loans. One interviewee noted that “Exhibitions have more support. They get additional resources, but they require a significant amount of time from collection management staff.”

Among interviewees there was, however, a wide difference of opinion over how close the tie between collections and exhibitions should be. One collections specialist, favoring a very close link, said, “There should be a rule that if something is not on display for two years, a flag goes up, and you have to say why you are keeping it and what you are going to do with it. It would force you to make decisions.” However, another curator at the same museum thought that a close link between collections and exhibitions was unnecessary: “It is not understood how separate the collections are from the work of the museum. Exhibitions should be done around the collections, but [this museum] does exhibitions that are important and then finds the collections. The percent of the collection in exhibitions is miniscule.” Others were even more explicit in stressing the need to separate collections and exhibitions. For example, one interviewee asserted, “Museums are only as good as their collections, regardless of what is on exhibit. Collections are the foundation, and building them is still valid.” The middle position is, in the words of one interviewee, “to use what we have, but not be constrained by it.”

The percentage of the Smithsonian's collections that is on display at any one time is relatively small. According to the OP&A survey conducted for this report, in FY2000 92,420 collection objects were on view in Smithsonian collecting units, or about one-half of 1 percent of total collections. By unit, the percentage of collections on exhibition varied from about 0.02 percent at NMNH to about 17 percent at HSD, with a median of about 3 percent.¹

This percentage reflects not only the massive size of Smithsonian collections (especially the scientific collections at NMNH) relative to Smithsonian exhibition spaces, but also the nature of exhibition-making practices today. Among the exhibitions created by Smithsonian units that were presented in Smithsonian museums in FY1999 and FY2000, for example, 58 percent of the objects were not from the Institution's own collections.² In addition, when Smithsonian museums show exhibitions created by other organizations, they devote gallery space to objects that are generally not from the Institution's collections — which further reduces the number of Smithsonian objects that can be displayed.

Recently there has been renewed interest among many museums in publicly accessible, nonthematic displays of stored collections, usually referred to as *open storage* (Hilberry 2002). In this type of presentation, large numbers of objects are made available in dense displays either in the open, behind glass, or with the facilitation of staff.

¹ For reasons discussed in the Introduction, the OP&A collections numbers differ from the NCP numbers quoted elsewhere in this report, both overall and for individual units. For example, the OP&A survey indicated a total object count of 166.3 million, rather than the 143.5 million reported by NCP. The percentages given here should therefore be considered approximate.

² Calculation is based on OP&A survey data, and excludes exhibitions by the Smithsonian Institution Traveling Exhibition Service (SITES).

Information on the objects is provided indirectly, for example, through booklets or information stations, rather than on individual labels and text panels.³

The design of open storage facilities typically allows the public to observe stored objects at close range. (The term *visible storage* is sometimes used to refer to arrangements where the public may view stored collections from a distance — as through a glass panel that allows a glimpse of restricted work space.) In many cases, staff conduct tours of the storage areas and answer visitors' questions; additional interpretive materials and virtual access may be provided through computer databases. Some collecting units also provide physical or virtual access to areas where conservators and researchers conduct their work.

Some non-Smithsonian museums have aggressively pursued open storage arrangements in recent years. The New-York Historical Society, for example, now displays 40,000 objects in 21,000 sq ft of open storage. London's Natural History Museum (NHM) recently opened the first phase of its new Darwin Centre, which allows the public both to see collections in storage and to interact with researchers. When the project is completed in 2008, almost 80 percent of NHM's 70 million specimens will be on public display.

At the Smithsonian, NASM's 760,000 sq ft Steven F. Udvar-Hazy Center (UHC) is mostly dedicated to open storage of hundreds of aircraft, spacecraft, engines, and other artifacts. A number of other Smithsonian museums currently engaged in construction or renovation projects — NMAI, SAAM, and NMAH — are planning significant open storage displays for parts of their collections, and FSG has been considering it as well.

While open storage allows larger numbers of objects to be shown while maintaining high levels of environmental and security controls, even generously scaled open storage requires selectivity and structure. As one Smithsonian curator pointed out,

³ A key difference between open storage and traditional public exhibitions is that the latter includes a thematic or narrative framework. Echoing the synoptic and taxonomic arrangements of a century ago, open storage usually uses a classification system as its organizing framework; by contrast, exhibitions commonly provide an interpretive context.

“The best design for open storage will relate to organization mission and audience. Who you are planning for makes a difference for close, visible storage.”

Interviewees cited a number of advantages to placing objects in open storage rather than in exhibitions, such as allowing visitors to draw their own conclusions about objects without relying on curatorial interpretation, inexpensively displaying large quantities of similar material, and providing opportunities for scholars to make in-depth comparisons. Open storage can be an engaging way to showcase collections and provide a behind-the-scenes glimpse of how collections are stored, conserved, and used in research. Advocates point out that opening behind-the-scenes activities to public scrutiny can help visitors to understand the collecting unit’s mission and functions, build the public’s connection to collections, educate the public, and help justify the expense of museum infrastructure. Demystifying museums in this way can lead to more visitors and greater financial support.

Critics argue, however, that open storage can be overwhelming, confusing, and frustrating to the public, and may make collections less available to serious researchers. Control and security of collections can also be compromised, increasing wear and tear on collections and raising the risk of damage. Moreover, the cost of building open storage is frequently greater than traditional storage.

research and reference

Not every collection is intended for display. Natural history collections, in particular, “have not been assembled for exhibitions” in the words of one interviewee, but rather are intended primarily for research and reference. As one NMNH interviewee said, “Our specimens do not lend themselves to public display. . . . We need to find ways to educate the public other than showing specimens.”

increasing visibility at the Natural History Museum, London

Visitors to NHM in London can now peer into collection storage areas, tour parts of the museum previously closed to visitors, and watch video links showing researchers at work. The Wolfson Wellcome Lab, NHM's biomedical laboratory, is at the forefront of efforts to demystify museum work and bring research to the attention of visitors. Scientists appear via live video link-ups on screens in the galleries, and throughout the day visitors can watch what actually goes on behind the exhibition space (Jha 2003).

According to an article in *The Economist* ("Behind the Scenes at the Museum" 2000), making more of NHM's collections accessible to the public is the idea behind the museum's newest storage/work space, the Darwin Centre. It is an open storage and research facility where the public can view everything from small animal specimens in jars of ethanol to larger animals in dozens of steel tanks. Home to nearly 100 scientists and 22 million zoological specimens, the first phases of construction of the Centre cost £27 million. Phase Two of the Centre is expected to be completed in 2007 at an additional cost of £65 million. The increase in public access to NHM's collections has been dramatic. Prior to the Darwin Centre, less than 1 percent of NHM's 70 million specimens and artifacts were on display. When the Centre is complete, visitors will have visible, physical, and electronic access to almost 80 percent of the collections.

Collections research takes a number of forms, but generally involves the study of collection objects to learn more about their fundamental characteristics and context. On the OP&A survey, Smithsonian museums reported that in FY2000 they used 1.2 million items in research, or about 0.7 percent of the total collections reported on the survey. By museum, the reported percentage of collections used in research ranged from 0.03 percent at NMAI to 85 percent at NASM, with a median of 5 percent.

Some collections, such as voucher collections of natural history specimens, are held primarily as reference in support of possible future research.⁴ The value of such reference collections lies not so much in their individual items, but in their overall depth and range. Like materials in libraries and archives, these reference collections can be a resource for other activities (including research and display), but mainly serve as tangible records that can be used to generate and investigate theories, interpretations, or narratives. A good example of the reference use of collections involves NMNH's collection of mosquitoes, which, with 1.5 million specimens, is the world's largest. The recent and rapid spread of the West Nile virus, which is transmitted to humans through mosquitoes, gave this collection new prominence; Smithsonian scientists are actively involved in West Nile virus research.

Although statistical data on the percentage of the permanent collections that are primarily for reference are not available, the OP&A FY2000 survey showed that the collections of the various Smithsonian archives contained about 1.2 million such items. In addition, practically all of SIL's holdings are intended for reference, and most of NMNH's vast holdings are for reference and research.⁵

education and interaction

Increasingly museums designate some collections, called “study,” “teaching,” or “demonstration” collections, specifically for handling by the public. Handling original objects gives users an enhanced experience of collections, engaging the senses of sight, hearing, smell, and touch. Handling objects removes physical and sensory barriers for everyone — including those with visual impairments. The objects in these collections are usually less valuable or rare than those in the

⁴ Voucher collections are taxonomic reference collections consisting of specimens of each reported taxon in a given scientific study.

⁵ In the case of natural history collections, it is often impossible to draw a clear and meaningful distinction between “research” and “reference” use.

permanent collections, are sometimes not accessioned,⁶ and are expected to have shorter life-spans than those of other collection objects. According to the OP&A FY2000 survey, there were approximately 73,000 objects or lots in these collections at the Smithsonian.

handling the real object

In the United Kingdom, in 1988 the National Museums Liverpool,* one of the first UK museums to offer an area dedicated to hands-on access to collections, opened its Natural History Centre. The museum plans to expand hands-on access through the addition of the Discovery Centre, a complementary facility that will make humanities collections (archaeology, antiquities, and ethnography) available for handling by visitors in a dedicated space. The museum is committed to using real objects for handling wherever possible, and will use replicas only when absolutely necessary. Both the expanded Natural History Centre and the Discovery Centre will be staffed by trained demonstrators whose job is to encourage interaction between visitors and objects. Visitors also have access to resources such as video microscopes, books, and the Internet.

*Until 2003, National Museums Liverpool was called the National Museums and Galleries on Merseyside. It was originally established in 1851 as the Liverpool Museum, and became a national museum in 1986.

Source: Munday (2002).

Is hands-on public access viable from the perspective of collections care? Recent research suggests it is possible to allow the public to handle some collections materials while still preserving them. The UK Council for Museums, Archives, and Libraries recently commissioned a study to investigate the impact of hands-on public

⁶ Some Smithsonian units use the term “study collection” to describe materials that are accessioned but are kept distinct from the “permanent collection” for reasons unrelated to educational programs.

access (Munday 2002).⁷ It found that the benefits of direct contact significantly outweighed the risk of theft or damage to objects, if the objects were chosen carefully and managed appropriately. The museums studied offered a wide variety of objects for handling, from vulnerable organic objects to more substantial stone sculptures and ceramics. The objects ranged in date from the Egyptian pre-dynastic period to modernity. While some were duplicates, many were unique pieces.

Different museums manage the risks to hands-on collections in different ways. For example, the Please Touch Museum in Philadelphia, Pennsylvania, assigns all objects to one of three categories to indicate handling status. Criteria for care, loans, and documentation vary for each category.

The Smithsonian makes a limited number of objects available for handling. NMNH has three hands-on learning facilities: the Discovery Room, the Naturalist Center in Loudoun County, Virginia, and the Orkin Insect Zoo. NMNH's Office of Education administers the facilities, and more than 200 trained volunteer docents help with activities. NMAH offers a Hands-on History Room, a Hands-on Science Room, and the Lemelson Center. The latter engages young people in the study and exploration of invention and innovation. Smithsonian collecting units also offer behind-the-scenes tours for the public. NMAI, for example, does monthly tours of the collections at its Cultural Resources Center (CRC) in Suitland, Maryland that enable visitors to make personal connections with the objects.

Hands-on opportunities benefit the collecting unit. For example, there is evidence that school visits increase when museums offer a handling facility, and that children who have enjoyable experiences at a museum later return as adults with their own families. The experience enriches visitors' understanding of collections and can lead to greater volunteer and financial support.

⁷ Case studies of 26 organizations included small and large museums in the United States, United Kingdom, Canada, South Africa, and other countries.

symbolism

A number of interviewees referred to collecting purposes apart from these direct and indirect uses, such as collecting for the sake of posterity, national identity, or the power of the object itself. This symbolic function is itself a form of use, although one that interviewees did not usually articulate. Rather, it was usually referenced indirectly in statements such as “collections are the heart and soul of the museum.” In the words of one interviewee, “Exhibitions and websites come and go, while the stewardship of collections stays as the core. The collections are our legacy and responsibility.” One interviewee noted how the role of collections can change over time: “Between 1978 and 1995 the priority in collections was to be legally accountable and physically responsible — to preserve. Now the emphasis has shifted to ‘use.’ It is like a pendulum swinging back and forth between preservation and use.” However, the view of the collection being important in its own right, apart from any particular use such as display or research, seemed to be a minority one.

The symbolic role of the collections is especially significant at the Smithsonian because of its status as a federal government institution, its location on the National Mall, and its national and international reputation. As several interviewees noted, by choosing to add an object to the Smithsonian’s collections, a museum is implicitly stating that the object is, in some sense, “important.” In the case of American historical and cultural items, it means that the item is considered part of the very identity of the nation. As one interviewee noted: “Museums define the culture by what they collect and don’t collect. It is a powerful, unspoken role.”

The changing nature of American identity is inevitably reflected in the character of the Smithsonian’s collections. The new NMAI and the prospective National Museum of African American History and Culture are two obvious examples of the symbolic function of the Smithsonian’s collections in reflecting changing national attitudes. At NMAI the symbolic role of collections is especially evident, since the collections contain spiritual items that are integrally connected to the tribes that

originally produced them and that are highly valued by their descendants as part of a living culture. The special relationship between NMAI and the Native American tribes that form its core constituency is enhanced by the recognition that the museum holds so many items representing the distinct identities of these nations.

In another kind of symbolic use, key icons from the collections are put forward to attract attention and resources to the museum, through such means as drawing in the public, raising funds, leveraging other collections, or gaining publicity. For example, the restored 1814 Star-Spangled Banner that inspired the US national anthem has an important symbolic function that NMAH exploits when it displays the banner's image prominently in its marketing.

tension among uses

Some interviewees expressed uncertainty regarding the relative importance of exhibition/display versus research/reference. The degree to which a particular use is emphasized often seems to depend on the individual preferences of curators and unit managers. Even within a single museum, an interviewee noted, "Some curators are very tied to the collections, and others don't know where to find them."

Both exhibition and research uses were sometimes seen as coming at the expense of preservation. Most items on exhibition need to be rotated at intervals to prolong their lives. Extremely fragile items can only be displayed or researched with great care. This tension between use and preservation is reflected in the comments of one interviewee:

There are two mindsets with collections staff: the mindset of physical orientation, where things should be perfectly lined up on the shelf and you don't want people to mess it up, and the research mindset of pushing use of the collections, which is more of a mess, and

marketing why we have the stuff in the first place. . . . As long as collections management is a handmaiden to research, we cannot develop the capability to hold our collections responsibly.

The tension among the different uses can be exacerbated by the fact that, as one interviewee observed, “At times collections serve many purposes; many purposes are not recognized at the time of acquisition.” A good example is the set of objects connected to Abraham Lincoln’s assassination. At the time that they came to the Smithsonian, they were regarded as inappropriate for display, although worthy of being preserved. Now NMAH not only displays these objects, but they are among the items that visitors find most compelling. A similar situation has arisen recently with the artifacts from the Columbia space shuttle disaster. NASM is reviewing the debris to see which pieces it might be interested in acquiring. A curator for the museum was quoted in the press as saying, “Initially, we wouldn’t have plans for it to go on display, only to collect it for preservation as historic artifact. What we might do in the future, I just don’t know (“NASA Seeks Advice About Displaying Pieces of Columbia” 2003).”

The varied uses for collections have implications for the ways that collections are described and developed. What makes objects important as records can be very different from what makes them important for display. For example, proper identification of an object is essential in a reference collection, while visual interest is more important for a display object. Museums often divide their holdings to some degree according to their uses. Smithsonian museums, for example, distinguish archive and library collections from object collections. Similarly, some museums divide their object collections between exhibition and study collections. Other museums have more elaborate structures. NPM has a master collection, a reference collection, and an exhibit collection of stamps.

Better knowledge of what a particular collection object is can also change how it is used. An obvious example is the recently re-attributed drawing of a candelabrum in the collections of C-HNDM. The drawing was purchased at very low cost in 1942 to join a reference collection of drawings of light fixtures, a resource for designers and

historians of the decorative arts. It was never shown publicly in the 60 years since its purchase. Now that it has been re-attributed to Michelangelo, it has become a treasure that C-HNDM will exhibit with considerable fanfare.

An example in the other direction is the “life car,” a sea-rescue transporter invented by Joseph Francis in 1845. In 1890 NMAH acquired the one used to save 199 passengers from a shipwreck in 1850. According to Lubar and Kendrick (2001), “It was one of the most popular exhibits on display at the turn of the 20th century and included on every list of Smithsonian treasures.” Although it was originally deemed especially important for exhibition, it is now more useful for reference on the history of safety at sea.⁸

Just as the dominant uses for individual artifacts can change over time, so can the dominant uses of a collection as a whole. The opening of the Hazy Center, for example, shifts the use of NASM’s collections from primarily research and reference to display, as a high proportion of major artifacts are now on exhibit after decades in storage. Time will tell if the scholarly use of the collections will also increase as a consequence.

A shift of mission can also lead to new prominence for a particular use. When the National Museum of History and Technology was renamed the National Museum of American History in 1980, this implicitly elevated the symbolic uses appropriate to the collections of a national history museum over the research and reference uses more typical in a museum of technology. Similarly, a change in a museum’s leadership from those interested in research to those more interested in exhibitions, or vice versa, can radically affect the use and development of a museum’s collections. At some non-Smithsonian art museums previously focused on building collections, for example, acquisition purchase funds are now limited to items that will support planned exhibitions.

⁸ Although no longer popular with or even familiar to visitors, the life-car has remained on display since it was acquired.

Some collecting plans imply a hierarchy of uses by identifying the kinds of objects that are sought for the collections. Typically art museum collecting plans stress the aesthetic quality of objects and their suitability for exhibition; natural history museum collecting plans stress appropriateness for research and reference; and history museum collecting plans emphasize representational value. A good collecting plan discourages the acquisition of objects that do not support the unit's core purpose and the associated uses of collections.

Collecting plans can employ a hierarchy of uses not only to determine which objects to acquire, but also to identify what can be deaccessioned. In a museum focused on exhibition, for example, retention of objects that cannot be displayed warrants careful consideration. Similarly, an unidentifiable item has little value in a reference collection.

Units can evaluate different collection uses through different performance measures. For example, the number of visitors and their levels of satisfaction can speak to the quality of display; the number of publications or citations indicates the value of a collection for research and reference; and the number of visitors who engage with a collection and the outcomes of those interactions can measure its interactive value. Even in the case of the symbolic use of the collections, surveys or rankings are a means to assess reputation.

trends in use

The OP&A study team identified two important current trends regarding the use of collections:

- The increasing impact of exhibitions on collections care; and

- Rising expectations with respect to access, including availability of information (online catalogues), physical access (open storage), responsiveness to specific needs (research visits), and loans.

the impact of exhibitions

A number of interviewees pointed to an important shift in the priorities of some museums. In the words of one interviewee, “The museum overall used to be about collections, now it’s [about] exhibitions.” As a result, the performance of some important collection functions is increasingly dependent on exhibition support. For example, exhibitions often receive outside funding, which can provide an infusion of money for collections care when conservation is included in the exhibition budget. Further, the priority placed on exhibitions means that, in many cases, the objects to be displayed get the scarce resources for conservation, documentation, and research, while others are obliged to wait until time and money are in greater supply.

increased expectations of access

Museums across the world have been adapting to the opportunities provided by new information technologies. New computerized CISs and tracking technologies are making collections control, access, and outreach easier, and ultimately less costly. The spread of networking technologies, in particular the Internet, has increased the demand for access to collections information. Making collections available on the Internet raises expectations with respect to intellectual access and loans. Strong public interest can be seen, for example, in the popularity of Smithsonian websites that focus on collections, such as NMAH’s *History Wired* and the collections section of *September 11*. A number of Smithsonian museums provide online catalogues of some or all of their collections.

The desire to meet this strong demand for access conflicts, however, with the reality of declining resources for collections work. As one interviewee noted:

Despite downsizing, more is now being asked of [the Smithsonian] in terms of access to collections and the data related to collections. These demands for access come through various channels: the Smithsonian Affiliations program, routine requests for the loan of objects from borrowers within the museum community, requests for printouts of databases, visits to collections and archives, duplication of manuscript, photographic, and recorded sound materials, and all manner of inquiries about our collections. In essence, we are caught between rising demands for access to our resources (demands which we truly want to fulfill), and limited resources and staff with which to discharge our responsibilities of stewardship to collections.

types of users and access

Users of Smithsonian collections can be classified into three broad groups: internal personnel, external researchers, and the general public. There are both similarities and differences in their interaction with collections, but common to all is a desire for easy, timely, and convenient access. Access, in turn, can be divided into physical access (direct contact with the object or specimen), and intellectual access (information about the object such as identification, interpretation, or photographic images).

three types of users

Internal personnel are those employed by or associated with the Smithsonian who regularly use collections. They include curators, scientists, museum specialists, collections management staff, fellows, interns, and volunteers. Collections managers

must, for example, have physical access to collections for basic location tracking and inventory, loan processing, condition assessments, and other uses. Curators need to be able to select objects for display and for lending to other organizations. Physical anthropologists must handle and study bones to unlock their secrets, such as changes in structure over time, or to solve the mystery of how someone died. Equally important, internal personnel need intellectual access to collections records and information.

External researchers include university students and professors, researchers from other museums and cultural or scientific organizations, other scholars, and consumers of research such as government agencies, nongovernmental organizations, and policy makers. As with internal users, this group requires very high levels of physical and intellectual access.

The **general public** includes people who want to see and learn about collections out of personal interest, and for other nonprofessional reasons. There is some debate about what this user group expects in terms of access. Saffo (1994), for one, claims that the general public is more interested in context — the story, the point of view, and the ideas — than in the object itself: “In a world of hyperabundant content, point of view will become the scarcest of resources.” However, some other museum professionals believe the reverse is true. In any case, museums traditionally have provided access to “the real thing” through exhibitions, which allow visitors to get close to objects but not to touch them. Indeed, providing opportunities to view “the real thing” from a safe distance is one of the distinguishing characteristics of a museum. Visitors usually do not expect to handle collections — although, as noted, research shows that such contact can in many cases greatly enhance their experience. Some Smithsonian museums, for example, FSG, also provide the general public with direct physical access to the collections by appointment. Many visitors also want intellectual access, in the form of images and written information.

physical access

Physical access is provided either by making the collection objects available in Smithsonian spaces or by lending them to other organizations.

onsite physical access

Internal personnel and external researchers who require physical access primarily make use of the collections and archives through in-person visits to storage areas. This less-visible side of collections work can require considerable staff time, since visitors must be coordinated, accompanied, and monitored, and inquiries must be investigated. Physical access requires that staff explain procedures, issue identification cards for long-term visitors, maintain access logs, retrieve objects for study, supervise researchers while they work with the collections, and answer questions about objects' history, provenance, condition, and other features. Because of the demands physical access places on staff, NMNH's Anthropology Department recently had to cut the number of days when visitors can access collections at the Museum Support Center (MSC) in Suitland, Maryland to three per week, and visitors must now make an appointment. (Department policy requires that visitors be accompanied by a staff member, and only three staff members are currently employed, with each assigned to handle visitors on one day of the week.)

NMNH reported that in FY2000 it had 2,200 scholarly visitors who spent 16,500 research-days in the collections. Officially designated Smithsonian collecting units as a whole forecast 37,500 research visitor-days to their collections in FY2003,⁹ a significant jump from the 31,000 visitor-days recorded in FY2002. Units not designated as collecting units, such as STRI and SAO, also receive research visitors.

⁹ These data were the most recent at the time of this writing. FY2003 visit data and other pan-Institutional performance measures are captured retrospectively and become available in FY2004.

Intellectual access is often the first step toward physical access, since researchers need to identify what they might want to handle, usually through information and images in collections records. When records are complete and easily searchable, wear and tear on collections is reduced, because researchers do not have to sift through objects in storage areas in search of the “right ones.” As one interviewee noted, “70 percent of the wear on collections comes from pawing through them to look for an object.”

Electronic access to collections information can significantly reduce the cost of providing physical access, as well as enabling multiple researchers to inspect the same object simultaneously. When scholars can select and “retrieve” objects themselves over the Internet and work without staff supervision, demands on collecting units’ staff and work space are reduced. For example, NMNH estimates annual labor savings of about \$515,000 from one automated data set available on the Web that receives about 1,300 visits per month.

Indeed, electronic access to collections information can sometimes eliminate the need for physical access altogether. Using high-resolution digital images, scholars can sometimes inspect an item in nearly as much detail as they could with the physical item, and with far less possibility of damage. For example, NMNH previously had to ship botanical type specimens to external researchers for study and reference, exposing these irreplaceable specimens to an increased risk of loss or damage.¹⁰ Now, in many cases, digital images and electronic records have eliminated the need to physically ship type specimens.

¹⁰ Type specimens are the first specimen used to describe a species. As such, they are crucial to classification and are the basis upon which species identifications are made.

fees for researchers

To defray some of the costs of serving external researchers, many collecting units charge a nominal fee for photocopying or photography services, and many reserve the right to charge for extensive or complicated research requests. The Museum of Anthropology at the University of British Columbia (MOA-UBC), however, has gone beyond nominal fees to a partial cost recovery scheme for commercial users. Charges for accessing the MOA-UBC collections are as follows (in Canadian dollars): object movement — \$20/hour, minimum 4 hours; supervision — \$20/hour, minimum 4 hours; museum photographer — \$50/hour; film, processing, supplies — at cost, including staff time. The museum does not assess fees for UBC students and faculty or for scholarly purposes. (http://www.moa.ubc.ca/pdf/Behind_the_scenes.pdf)

The income generated is not substantial, but does help recover some of the costs of physical access. In 2002, MOA-UBC received \$550 in income from 97 photography requests and \$1,762 from 40 filming requests — plus \$40,000 from a request from a feature filmmaker for three days of access to the collections.

Smithsonian Photographic Services (SPS) and other Smithsonian museum photography departments assess also fees for certain services, but Smithsonian units do not attempt to recover the costs of physical access, even partially. Current SPS fees range from \$25 per color slide (35mm) to \$400 for a 24-48 hour rush order per high resolution scan (600 DPI TIFF file* at 8x10 inches). There are no standardized fees across Smithsonian photography departments.

* DPI = dots per inch. TIFF = tagged image file format, a standard compression format for digital images.

In a few cases, digital images can even provide more information than the physical objects themselves. For example, images of documents can sometimes be “repaired” through computer manipulation to clarify blurred text, replace portions missing from

the original, and so on. And of course, in those instances where items have been lost, damaged, or destroyed, surviving electronic records can provide the only remaining form of access, albeit virtual. For example, Smithsonian AAA collections include microfilms of the correspondence of Max Beckmann, a leading twentieth-century artist. AAA microfilmed Beckmann's papers, which came to it on loan, and later returned them to the family. Years later, when Beckmann's collected correspondence was to be published, the original letters could not be found. Without AAA's microfilms, the publishing project would have been impossible.

Other technologies may improve or expedite physical access to the collections. Radio frequency identification (RFID) tags, similar to those used in highway toll systems, retail stores such as WalMart, and Defense Department suppliers, could further reduce the amount of labor required to handle collections inventory and access.¹¹ One advantage of RFID technology is that it allows a desired object to be located without disturbing other objects, except those in the object's immediate proximity. It would also enable routine inventories to be conducted without physically touching the objects, thus reducing both labor costs and wear and tear on collections. RFID tags can contain more information than barcodes; descriptive information on an object can be recorded on the RFID tag, so that each item carries much of its catalogue information with it.

loans

Loans of collection items to other organizations are another way that the Smithsonian provides physical access to its collections. The majority of those who work in Smithsonian museums feel an obligation to lend to other museums. As one interviewee said, "lending is part of our mission." Smithsonian museums also

¹¹ Adopting RFID technology would be expensive and challenging, but costs are decreasing as the technology spreads: while RFID tags cost \$1 each in 2000 (Niemeyer, et al. 2003), by 2003 this had dropped to 25-40 cents. In a few years, tags are expected to cost no more than 5 cents. Although initially readers (approximately \$500) and imprinters were expensive, prices are expected to drop over time.

depend on loans from other organizations and are eager to reciprocate the generosity of colleagues. In FY2000, the Smithsonian lent 170,000 items from NMNH and 5,500 from all other museums. In the same year NMNH borrowed 328,000 items, and all other Smithsonian museums about 5,000 items.

Loans are important to strengthening the image of the Smithsonian among the public. They are reminders of the depth and importance of Smithsonian collections, and a sign of the Institution's commitment to audiences and museums nationally and internationally. The Smithsonian Institution Traveling Exhibition Service (SITES), for example, extends the reach of Smithsonian collections by sending out exhibitions that include loans from Smithsonian museums. Similarly, the Smithsonian Affiliations Program was originally begun as an outreach activity to make Smithsonian collections available across America through long-term loans; its lending increases awareness and support for the Smithsonian by building close ties with museums across the country.

Interviewees frequently talked about the work and expense that lending requires. One interviewee commented, "To lend out, we have to do site inspections, object inspections, and so on. It is a huge workload for which we get no money back. It is better to let things sleep in storage boxes." Another explained:

In the cost of loaning objects, staff is a major issue. One guy is on the road about three months a year, helping to install loan objects. [Our museum] doesn't get reimbursed for staff time, but does get reimbursed for expenses. It might be costly, but if we can help another museum, we will do it.

Much of the complexity in arranging for loans arises from the processes required to insure the loan is responsible and that the loaned object will be reasonably safe. These processes begin with assisting the borrower to identify the object to be loaned. The less information a borrower has about the content of collections, the more time the lender must spend working with the borrower. As one interviewee noted, "We need to find ways to get information to people around the world without sending

specimens or having to talk to a staff person. This needs to be an Institutional priority.”

Once the loan item is clearly identified, the collecting unit needs to determine whether it can lend the item; if so, it must be photographed, conserved, and insured. Once the loan receives formal approval, the lender then has to make all the arrangements to get it to the borrower, including preparation, packing, insurance, and shipping. In most cases the borrower pays for packing, shipping, and unusual conservation. Sometimes, however, the lending unit pays some of these costs, such as when the lender and borrower are collaborating on a project or when the lender anticipates a *quid pro quo* in the future.

According to the data collected in the OP&A study, the total estimated cost of outgoing loans in FY2000, including the costs of staff time, was \$2.8 million. This was about 4 percent of the total amount spent on all aspects of collections.¹²

A particular concern that interviewees voiced was loans to affiliates. A number of interviewees commented that in some cases the Affiliations Program has increased the costs of the upfront consultation stage, because new affiliates are less likely than traditional borrowers to have a clear idea of what exactly they want to borrow. Subsequent stages can take longer as well. As one interviewee commented,

In the case of affiliates it looks to collections management staff like this is a whole new ballgame . . . affiliate requests seem to require quite a bit more “hand holding” and staff time. Many affiliate museums do not have expertise in handling or exhibiting, and they expect Smithsonian staff to guide them through these processes. [The registrar] foresees having to send staff to actually install the exhibits, complete condition reports, and generally take care of all the work needed to assure safe handling and care of the loan. For traditional loans that is just a given; those they have loaned to and borrowed from in the past know what to expect and are professionals in the field. [This is] not so much the case with many affiliate museums.

¹² For more details on the costs of both incoming and outgoing loans, see Chapter 6 and Appendix G.

To facilitate loans to affiliates, the Affiliations Program has assigned coordinators to work closely with prospective borrowers to ease the process. Even so, its work is dependent on the cooperation of the collecting units that hold the objects and have authority over the lending process.

Both Smithsonian and non-Smithsonian borrowers have criticized Smithsonian loan procedures as being excessively difficult. Some interviewees commented that Smithsonian lenders demand conditions in excess of what they themselves provide for their own collections. Perhaps ironically, some Smithsonian staff noted that the requirements of Smithsonian lenders are so rigorous that they have found it easier to borrow from outside the Institution:

What makes lending and borrowing so difficult is the Smithsonian acting like the Smithsonian. We're overcoming that, but it is a battle . . . We needed something [from the] 18th century and couldn't get anything from [a Smithsonian museum] so we got it from the British Museum. We would borrow from [another country] rather than asking [another Smithsonian museum].

A number of interviewees noted the high level of demand to borrow Smithsonian objects. "We get more requests for loans than we can process; we can't get material out the door fast enough." The situation is particularly complex when multiple museums want to borrow the same things: "It is a challenge to mediate multiple requests for the same group of items."

The most frequently mentioned obstacle to meeting the demand for loans was the insufficiency of staff. According to one Smithsonian museum interviewee, "Essentially, we have no resources to apply to lending. The loans we are doing now are breaking our backs." Several interviews reiterated the point, already discussed above, that greater access to information via the Web would make the process far more efficient, as borrowers would be able to identify what materials interested them at a distance, without taking up the time of Smithsonian staff.

Interviewees also pointed to concerns they have after delivery of a loan, several relating to long-term loans. This first is the lack of adequate capacity to monitor loans. There are simply not enough resources to allow Smithsonian representatives to travel to all borrowing institutions. Second, there have been cases where the borrower was reluctant to return a long-term loan. As explained by an interviewee,

Another problem that stems from this lack of contact with the borrowing organization is that that group “forgets” that a certain object doesn’t actually belong to them. There have been a number of instances in which, when called about the expiration of the lease, the contacted staff person expressed a genuine disbelief that said object was not part of that museum’s collection.

Third, sometimes the lending museum does not want a long-term loan object to be returned unexpectedly, because of its own resource limitations. As one interviewee noted, “The loans could be sent back at any time. . . . There is no room for them [here at the Smithsonian].”

Given the resources required to process loans, collecting units experience tension over the relative priority they should give to their mission to provide access through loans, and their mission to care for and document the collections. One interviewee admitted, “We’re trying to get staff to say ‘no’ to some loan requests.” On the other side, another interviewee complained, “Sometimes we don’t even get responses to our loan requests. We’ve had a request at [two Smithsonian museums] for a year. We couldn’t even get a response, no matter how many times we asked.” In addition to creating direct problems for external borrowers, a unit’s decision to apply scarce resources to collections care or exhibitions rather than to loans can cause difficulties for Smithsonian programs such as SITES or the Affiliations Program, whose missions are based on sharing the Institution’s collections with external organizations.

Some interviewees explicitly talked about the sense of public responsibility that encourages lending in the first place, but questioned whether loans are the most efficient way to achieve access:

We should make more of the collections available nationally, but often the [borrowing museums] are ending up taking stuff off exhibit at the Smithsonian to put it on exhibit at their museum. . . . More people would in fact see these items if they were still on exhibit here at the Smithsonian on the Mall.

Another question is, where will collections be safer? In some cases, due to poor storage conditions at some Smithsonian museums, objects might be better off on loan. According to one interviewee, “We are pushing long-term loans of as many [of these items] as we can lend. The Smithsonian insists on perfect environmental conditions; meanwhile [our storage facility] is falling apart. It is more important to lend them.”

intellectual access

In the past, intellectual access was provided primarily through print publications, such as collection catalogues, exhibition catalogues, monographs, and journal articles, and through collections records, such as accession files, catalogue cards, and ledgers. Today, one of the main reasons museums, archives, and libraries digitize their collections is to improve intellectual access.

The Internet now offers all user groups expanded access to collections. Through it, the Smithsonian can provide access to objects that might never be displayed in an exhibition, or that individuals who do not visit the Smithsonian might otherwise never see. According to the Pew Internet & American Life Project (Madden 2003), which tracks Internet usage, an estimated 600 million people around the world use the Internet. In the United States in 2003, the number of adult users was 126 million, or about 63 percent of the total adult population, and more than 75 percent

of people between the ages of 12 and 17 went online.¹³ The number of people connected to the Internet has grown more than sevenfold since FY1996, when the Smithsonian introduced its home page (www.si.edu).

let your fingers do the touring

The State Hermitage Museum, which occupies six buildings in St. Petersburg, Russia, holds over three million works of art collected over two-and-a-half centuries, including objects dating from the Stone Age to the 20th century. Now you can visit the treasures of the Hermitage without leaving home — the museum has created a so-called “digital self-portrait” to share its collections around the world. The virtual visual tour offers panoramic views of the palace rooms as well as the exteriors of the buildings, plus a detailed look at the collections. IBM’s Query by Image Content search technology helps you locate artwork using visual tools. For example, you can find a certain type of artwork by selecting colors from a palette or sketching shapes on a canvas. You can also refine existing search results by requesting all artwork with comparable visual attributes.

Source: http://www.hermitagemuseum.org/html_En/11/b2003/hm11_2_1b1arch.html.

Website activity at the Smithsonian continues to grow steadily. In FY2003, 36.7 million unique visitors logged more than 75.8 million visits¹⁴ to Institution websites, including the Smithsonian home page and more than 70 other sites. This is more than double the number of on-the-ground visits to Smithsonian museums on the

¹³ For more information on regional, ethnic, age, and racial differences in Internet activity, see Madden 2003.

¹⁴ The Smithsonian’s WebTrends program defines a *visitor session* or *visit* as all activity, from beginning to end, of one visitor to a website. If a visitor is idle longer than the idle-time limit (currently 30 minutes), WebTrends assumes the visit has ended; if the visitor later resumes browsing, a new visit is counted. The number of *unique visitors* is determined by IP addresses, domain names, and cookies. No matter how many visits a particular user may make, that user is counted only once in this category.

Mall.¹⁵ Growth in web activity has been dramatic since FY1996, when the first Smithsonian website went up and about 2 million unique visitors were counted; and growth continues at a strong pace — the visitor count in FY2003 was a 33 percent increase over the figure of 27.6 million unique visitors in FY2002.

Figure 3 illustrates the steady increase in online visitor sessions to the Smithsonian home page and more than 70 other Web pages hosted and tracked by the OCIO Web Services team.¹⁶ When the general public visits the Smithsonian on the Internet, it usually logs onto museum websites rather than the Smithsonian home page. Only about 1 in 25 online visitors to the Smithsonian website enter through the home page. An online survey conducted in the summer and fall of 2003 revealed that much home page activity related to planning visits to Smithsonian museums — 38 percent of visits in the summer and 25 percent in the fall. A quarter of home page users had no specific activity in mind and said they were browsing, and 20 percent of users sought specific information.

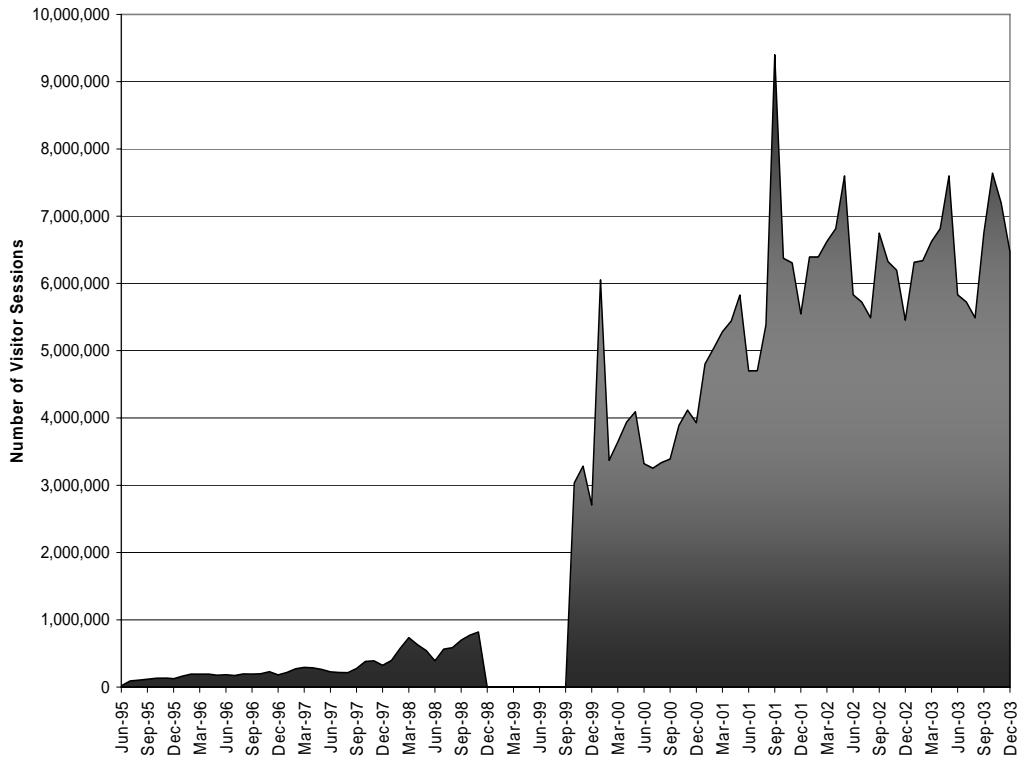
barriers to access

Many of the Smithsonian's collections suffer from problems that impede physical or intellectual access, according to responses to the OP&A FY2000 survey and the FY2003 follow-up. Table 5 details the range of problems that museums reported to OP&A in these surveys. (Not all museums provided updates for FY2003.) In some cases, a single problem hinders access to nearly an entire collection, and in others

¹⁵ Other museums and cultural organizations have experienced similar trends. For example, the Library of Congress National Digital Information Infrastructure and Preservation Program receives around 2 million requests per day for digital files, roughly equal to the *annual* number of visitor requests for items to be delivered to its reading rooms.

¹⁶ The collecting units host other virtual sites and track them separately. For example, *visits* to NMNH online collection sites totaled about 590,400 in FY2003.

Figure 3. Smithsonian Online Visitor Sessions, June 1995 to December 2003



Source: Smithsonian Institution WebTrends Enterprise Reporting Server. Data from December 1998 to September 1999 are unavailable.

Note: The OP&A study team requested website visitor information from several other cultural institutions and popular entertainment sites. Only the Library of Congress was willing to share this information, but regretted that system improvements for gathering and analyzing website statistics were underway. Until this improvement process is completed, the information is unavailable.

more than one problem is present. While there were conflicting views on the extent of some problems, two issues stood out in the survey data: (1) processing backlogs and insufficient records/documentation; and (2) inadequate workspace/equipment/staff. Among the museums, NMAH and NMNH most experienced these problems.

Table 5. Access Barriers Reported by Museums, FY2000 and FY2003

Access issue	Number of units experiencing problem^a	Smallest % of objects affected^b	Largest % of objects affected	Suggested causes	Status at 3-year update^c
Insufficient records, documentation	12	3	91	Staff shortage	Little change
Inadequate work space /equipment/ staff help	11	5	91	Staffing most critical, followed by space	Unchanged, except at units undergoing major renovations
Processing backlogs	10	1	73	Staff shortage	Major progress only where staff resources became available
Storage space hinders ready access	10	5	72	Crowding; multiple storage locations	Little change
Health/ environmental hazards	7	< 1	22	Object composition; contamination	No update provided
Potential deterioration/ collection condition	11	1	18	Special conservation needs; conservation resources limited	Little change

Source: FY2000 OP&A survey and FY2003 update.

a. A total of 14 units responded. In many cases, more than one collecting division responded per museum. (For example, six collecting departments at NMAH noted insufficient documentation). For purposes of reporting the data, the OP&A study team combined these responses.

b. I.e., Lowest percentage of collections affected by the problem, among units where the problem was mentioned at all.

c. Based on limited responses.

According to the survey data, insufficient records/documentation affected about 38 percent of collections and processing backlogs affected about 7 percent in FY2000.¹⁷

Generally, units attributed these problems to a lack of staff to create and update records. Progress in redressing these problems in the period between the two surveys was uneven. In some cases, competing or more pressing demands exacerbated the problem. On the other hand, some units made substantial progress on their backlogs, in part because they prioritized backlogs affecting key collections and made extensive use of volunteers. And movement of the collections at NASM and NMAI to other locations necessitated getting the electronic records into better shape, so that both units completed inventories as part of their transition to new buildings.

Another common problem that affected access, according to the OP&A FY2000 survey, was inadequate workspace/equipment/staff help for users.¹⁸ Of the three, staff shortages appeared to be the most critical, followed by workspace constraints. By FY2003, a number of museums had been able to improve or eliminate their workspace issues through facility redesign, construction, or new equipment. For example, when the botany section at NMNH found that it could not add specimens to its herbarium collections in some storage areas without damaging existing specimens, it engaged in a long-term plan to upgrade the capacity and quality of its storage space and equipment. One measure was to replace substandard cabinets with modern, well-designed compactors, which increased capacity by as much as 44 percent and improved storage quality.

¹⁷ These two problems are interrelated in the sense that processing backlogs — past acquisitions that have not yet been documented at the registrarial level — result in insufficient documentation. However, insufficient documentation can arise for other reasons, such as staff shortages or competing priorities that prevent new acquisitions from being properly documented, pending decisions on accessions and so on. The incidence of these complaints varied widely among collecting units. At the high end of the scale, NMNH estimated that insufficient documentation affected almost 50 percent of its collections (62 million objects). By contrast, at NMAfA only 200 objects were affected — less than 3 percent of its collections.

¹⁸ Inadequate workspace, equipment, and staff were combined as a single category in the OP&A survey; but comments revealed that the responding units considered these to be three distinct issues.

Collecting units reported that the storage of collections at more than one site was a problem for both internal and external users. Interviewees frequently noted the inefficiency that results from having collections split between DC and Suitland, particularly in the case of external researchers. This issue appeared particularly acute at NMNH, where one interviewee observed, “A researcher comes to NMNH for, say, three days, and doesn’t want to spend them going back and forth [from the Mall] to Suitland.” To address this issue — as well as other concerns related to natural history collections research and stewardship — a number of interviewees raised an idea that has been discussed since the 1960s: the creation of a federal interagency natural history facility on land owned by USDA’s Agricultural Research Service in Beltsville, Maryland. As envisioned, this facility would house not only all of NMNH’s biology collections, but also those of other federal departments such as Agriculture and Interior — and possibly collections from other NMNH departments (geology and anthropology) and Smithsonian units as well. Research space would be fully integrated in this facility, thus ensuring natural history researchers easy access to a huge variety of natural history collections. (The federal interagency natural history facility is discussed in more detail in Appendix E.)

Where the archives and libraries reported barriers, they tended to parallel those cited by the museums. Again, the broad areas of (1) inadequate workspace/equipment/staff and (2) processing backlogs and insufficient records/documentation were cited most often.¹⁹ According to the OP&A survey, inadequate work space/equipment/staff hindered ready access to almost a quarter of archival/library collections (about 40.7 million items); processing backlogs affected about 22 percent (37.1 million items); and insufficient documentation affected about 10 percent (15.9 million items).

¹⁹ The responses to the OP&A survey were not consistent across units, as SIL and the archival units used different measures for their figures: total items, total titles, and total linear/cubic feet. To deal with this issue, the OP&A study team used the same approach as NCP, converting 1 linear/cubic foot into 2,000 items.

the challenges of electronic access

Digitized collections information has made Smithsonian collections staff more productive and has improved recordkeeping of Smithsonian collections. However, public electronic access to Smithsonian collections information poses many challenges to collecting units and users alike due to (1) the multiplicity of Smithsonian websites and pages, and the fragmentation of computer systems (both centrally at the Smithsonian and within the units); (2) the huge scale of potential digitization at the Smithsonian, given the large number of holdings and extent of documentation still on file cards or in ledgers; and (3) uncertainty over what level of information to provide.

multiple sites and fragmented systems

In December 2003, the Smithsonian Web presence comprised 447 websites belonging to numerous administrative offices and collecting units.²⁰ Of these, 61 percent were dedicated to virtual exhibitions — that is, thematic exhibitions delivered online, hosted by Smithsonian offices and collecting units. Centralized administrative resources such as maps and visit planning information and the Smithsonian Store (www.smithsonianstore.com) comprised 15 percent; and sites for individual units and programs, 24 percent. For example, the Smithsonian Center for Education and Museum Studies (SCEMS) maintained a website that provided teaching materials and other educational resources for teachers, students, and families.

²⁰ In December 2003, WebTrends was tracking 75 major “virtual websites” — associated with particular Smithsonian museums, units, research programs, and exhibitions — plus the main Smithsonian homepage. These, in turn, encompassed a total of 447 individually monitored sites. For example, a museum may have an overarching “virtual site” with a number of separately tracked exhibitions sites within it.

At the time of this writing, there was no centralized mechanism for maintaining consistent linkages to centralized resources such as the home page or visit-planning information, and no overall online strategy. No website planning guidelines existed to ensure consistent information across units and pages. For example, not every page in the Smithsonian's network included a link back to the Smithsonian home page or to the Smithsonian Store.

A recent Smithsonian Web Content Initiative sponsored by the Office of Public Affairs was exploring the possibility of creating a more consistent approach for the Smithsonian's online presence, as well as investigating strategies to expand and cultivate audiences and generate more revenue online. Strategies had yet to be determined, and the timeline for completing the project was unclear. In the interim, studies of Smithsonian virtual visitors were continuing, and creation of consistent, visitor-driven Smithsonian Web pages remained a major goal.

Another challenge to electronic access was the large number of different technologies used by the collecting units, and the resulting fragmentation. In reviewing the current system, OCIO identified 80 commercial and 73 custom-developed application systems operating in a variety of hardware and software environments, from desktop workstations to mainframe computer systems. At the same time, OCIO got over 50 requests in FY2003 for information technology (IT) projects that would require common capabilities across more than one unit. (The individual units were using centrally supported Web servers to provide public access.)

Units that did not have a good unit-wide computerized CIS were working to set up such systems.²¹ Prior to the 1980s, typically one individual tracked the physical condition, accession status, and loan activity for a given object and recorded the required information in handwritten notes. When computers gradually became available, individual departments within collecting units developed their own systems for tracking collections management information. These systems, referred to as “legacy systems,” were often geared toward a very specific type of user or purpose and may have been available on only one machine. The lack of any common structure prevented linkages or information sharing.

Over the past several years, Smithsonian units have been transferring information from their legacy systems into their central electronic CISs, although much information remained trapped in obsolete electronic systems and handwritten documents outside the reach of the CIS. At the same time, the units have been digitizing new acquisitions. Over the long term, all units will offer CIS records enriched with images, research findings, curatorial notes, and other information.

The collecting units were using six commercial software packages for their CISs, selected on the basis of unit needs, software functions, and interoperability among peer organizations.

- The art museums, NASM, and NPM selected *The Museum System* (TMS), a product of Gallery Systems.
- NMAH selected *Multi MIMSY*, a product of Willoughby Associates.

²¹ In this report, “CIS” refers specifically to a centralized electronic collections information system *for a unit* (or several units) — including hardware, software, databases, and digital records and images. Many Smithsonian collecting units also used noncentralized computer systems to manage a portion of their collections, and sometimes these were loosely referred to as “collections information systems.” But such systems were fragmented and might not have been available to all users. For example, NZP operated Zoopix, a stand-alone database of photographs that was not linked to other specialized databases for centralized information management.

- NMNH had *Electronic Museum* (KE EMu), a product of the Australian-based company KE Software.
- The libraries and archives, plus several research offices, had *Horizon* (from the software provider Dynix) as the basis for the Smithsonian Institution Research Information System (SIRIS).
- AHHP used *PastPerfect* (from Pastime Software) to manage the Castle furniture collection, and HSD employed BG-BASE (by BG-BASE, Inc.) to manage the live orchid collection.

At the time the research phase of this study was completed, NMAI was in the process of selecting a CIS.

Additionally, museum staff noted the need for a centrally administered portal to the various CIS systems. This portal would allow searching across the various units and provide easy access to collections information for the Smithsonian central administration, as well as some degree of public access, regardless of which CIS program a unit was using. The portal concept would enable a timely response to questions such as, “What does the Smithsonian have on butterflies? (Mangerie 2003).” Answering this type of basic question may be just a first step toward integrated and expanded information retrieval. Visitors also tend to ask compound questions — “What do you have on butterflies, and do you have materials and images that I can use in my classroom?”

the scale of digitization

A second challenge was the cost and scale of digitizing the Smithsonian’s collections. As noted in Chapter 1, Smithsonian collections reported to NCP in FY2002 included about 143.5 million objects, 163.9 million archive items, 6.9 million linear feet of

film, and 1.5 million library volumes. At the time of this writing, only 9.3 million automated records existed throughout the whole of the Institution, and electronic images existed for only 1.3 million items. NMNH faced the greatest digitization challenge because of the size of its collections.

While there was strong interest within the units in moving forward with digitization, progress has been slow for many because of resource constraints. Interviewees spoke of these constraints as the main barrier to improving electronic access and digitization. As one source noted, “Given current priorities, staffing, and funding levels, the work is carried out intermittently as time and resources permit, and in some areas has virtually stopped (Smithsonian Institution, Smithsonian Institution Archives, National Collections Program 2003a, i).”

Some interviewees also suggested that the failure of Smithsonian management to push digitization efforts, or indicate where they fell on the list of Institutional priorities, was a huge obstacle to rapid and effective digitization. Without recognition of digitization as a high priority, they noted, efforts were likely to proceed slowly and unsystematically:

Even today, automation of collections information for public access is not seen as an important or a mission-critical endeavor of the Smithsonian, so the effort is hit-or-miss. The museums are only barely committed to management systems. . . . People only participate if they see a personal gain.

One interviewee placed the costs of digitization in perspective in the following terms: “To get 30-50 percent of [our] collections data, the key data, into the CIS would cost \$20 million [at our unit] — the cost of a major exhibition.” Another offered a similar comparison: “The renovation of the seal pool at the Zoo cost \$45 million. That’s more than the OCIO allocation! Clearly, the focus is on physical exhibits.”

According to information collected from the units by OCIO, projected costs for CIS digitization — including digital images, catalogue and transaction records, migration of legacy data, and maintenance operations — will run to many millions of dollars over the five years from FY2003 through FY2008.²² In FY2003, OCIO formulated a comprehensive approach to establishing a set of integrated IT systems to store, manage, and enable Web access to the Smithsonian's research and collections (Smithsonian Institution, Office of the Chief Information Officer 2003a). OCIO has also devised a formal plan for system architecture improvement to create a "Digital Infrastructure." The plan would augment the existing CISs with additional components such as an image storage and maintenance system. Although the Smithsonian included funding for the plan in its FY2005 budget request, it was not approved; OMB immediately rejected all budgetary requests for digital infrastructure or digitization projects.²³ OCIO indicated that without dedicated resources to improve the digital management architecture, it likely will not be able to pursue system redesign.

There were wide variations in the level of digitization across collecting units and even within them. One interviewee described the stark differences at one museum:

Ninety-seven percent of our [department's] records are digitized. The basic information, for collection management purposes, is in very good shape, but not perfect. For research purposes, the information is accessible within the museum to help with inquiries. But the story is very different with [another collection at this museum]. Only a fraction of that collection is on the computer. They won't be able to complete it without a concentrated effort. We made it happen with temporary staff; the [other collection] never got the staff.

²² All IT technologies have a limited useful life, after which they must be replaced; as with many software products, the expected life cycle for a CIS is five years. For comparison, workstation components have a four-year replacement cycle, UNIX servers a six-year cycle, and telephone systems a 10-year cycle.

²³ As of this writing, the Congress had not yet approved the FY2005 budget, but OMB had rejected the Smithsonian's request for this funding in the initial budget request in November 2003.

The inability of some units to move forward effectively with digitization has caused enough frustration that some staff have chosen to leave the Smithsonian over it.

information levels

Another challenge is to decide what level of information should go into electronic records. Various layers of information exist, including basic data, digital images, interpretation, and metadata records.

basic data

Basic data is especially important for effective collections management as well as access. At the very least, it includes an object's catalogue number, accession number, basic identification ("tombstone data"), and inventory and tracking information, but it often goes well beyond this information (Re:Source 2003b, 23). For example, basic data can include information on media and artist for artistic works; on cultural use for cultural history items; on taxonomic classification and collecting location for biological specimens; and so on. The appropriate type and amount of basic data depend partly on the object.

Interviewees noted a number of problems with basic data at the Smithsonian. The most fundamental was the need to address backlogs and work toward complete documentation of collections. One interviewee said, "New acquisitions are batch accessioned, but there is a huge backlog of processing from years back. This means poor accessibility and conservation." Another concern was inaccurate or arbitrarily entered documentation. One museum noted that 30 percent of its records contained errors, such as misidentified objects. Even documentation that was accurate at the time of entry may need to be updated to reflect new information, such as recent identifications and changes in taxonomies, political boundaries, and cultural terms.

An interviewee from NMNH noted, “We still have specimens labeled as from the Oklahoma Territory, instead of the modern location. Also there have been species differentiations that are not reflected [in some objects’ documentation].”²⁴

However, a few interviewees suggested that, at least in some cases, the time and effort devoted to complete accuracy in documentation may be wasted: “If you know what you have — and curators know their objects — then I don’t think you need to spend time to get everything right. There may be a documentation level called ‘good enough.’” Other interviewees pointed out that such unrecorded curatorial knowledge is lost when the curator leaves the Institution.

digital images

All Smithsonian units were working to incorporate digital images in their CIS records, as noted. Such images facilitate access to collections by staff, researchers, affiliate museums, the central administration, and the public. CIS records contain several different types of digital images, some more resource-intensive than others. At the lowest level, there may be a registration print for objects. These can be low-resolution shots from a digital camera that are stored as small files — for example, JPEG²⁵ files under 500KB. These shots, which comprise the majority of images in CISs, are intended as quick reference intermediaries, rather than as final products. Although such images are insufficient to serve detailed research needs, when posted on a website or a CD, they do enable potential users to review collection objects and narrow their requests. For example, 95 percent of NMAI’s objects are digitally imaged as low resolution, 10KB JPEG files. The majority of these were taken by collections personnel, rather than by professional photographers. These low

²⁴ Origin information such as “Oklahoma Territory” may be retained elsewhere for historical interest, but without the use of a Geographic Information System (GIS) component or a geographic thesaurus, the modern location is the more appropriate identifier.

²⁵ Joint Photographic Experts Group. JPEG format is a standard compression format for digital images.

resolution images are intended primarily to serve the internal needs of collections staff.

Higher resolution images require more staff time to create and more capacity to store. For example, three-dimensional imaging of an object requires the integration of at least 36 digital pictures. Depending upon the object, the photography itself may be the simpler part of the imaging process. Cleaning up a digital image for public output and adding identification text (typically provided by a curator) are frequently more time-consuming. In part, object type, use, and the availability of resources determine the appropriate image type and quality. However, the criteria by which certain items were chosen for more sophisticated imaging remained vague at many units, and there were no Institutional guidelines for making such selections. When high quality images were required for publications, research, or other specific purposes, these might be obtained from Smithsonian Photographic Services (SPS) or one of the photographic departments within a museum, which possess the expertise in lighting, photography, and scale vital to producing high resolution, high quality images.²⁶ Images created by SPS were typically secured at high resolution in an 18MB TIFF file, but the staff could reproduce images up to a 770MB file size upon request. Regardless of the level of resolution, however, capturing images of the bulk of Smithsonian collections poses significant resource challenges.

Copyright and other legal restrictions are a further issue with digital images. Gift restrictions or donor conditions may prevent duplication, distribution, or photography of certain objects. NMAH, for example, does not own the pair of the ruby slippers worn by Judy Garland in *The Wizard of Oz* that it has on display, and copyright restrictions prevent the museum from putting images of them online. Cultural, religious, or political sensitivities can also influence which objects and images are available to the public.

²⁶ Because of the unique nature of their imaging needs, many Smithsonian units maintained their own photography departments, which provide services similar to those that SPS offers. They charged nominal processing fees for photo requests by non-Smithsonian users, and Smithsonian staff who wanted an image above a certain resolution or size. These fees do not fully recover costs.

The storage requirements for digital image files are considerable; one interviewee noted that “it takes a 100MB image to replicate 35mm film.” As collecting units add more digital images, they will need to increase their storage capacity.²⁷ For long-term archiving the Smithsonian currently requires four versions of each image: a raw file produced by a camera; an untouched scan file; a cropped and color-corrected file; and a print file geared to a specific printer. Every image is backed up on a CD (or sometimes DVD) and held in cold storage.²⁸

community-based records documentation at NMAI

Finding the time and personnel for digitizing collections records is a perpetual challenge, and different museums approach it in different ways. For example, the Royal British Columbia Museum invites the public to help research objects from their own communities.

NMAI has been working on a similar idea: collaborating with native communities to enrich digital collections records. Such public input could expand and deepen the content of NMAI’s records at little cost. According to one interviewee, “Native tribes know [about some of the collections] better than the staff. We’re looking at tools to return information from the native community to the catalogue. . . . We’ve developed prototype software to provide a copy of the existing record and image, and to give the community the ability to add information. Right now the [30] tribal colleges are very interested in working on a pilot project.”

²⁷ Greater detail on resource-related issues can be found Chapter 6 of this report.

²⁸ SPS keeps an archive of every image it creates. Museums send their own images to SPS for storage in the cold storage archives maintained by SPS.

Preserving digital images over the long term still raises many questions. According to one interviewee,

We know how to keep film for a thousand years. We have a cold storage vault that will keep color negative film for at least 500 years; there is science for that. But now that we do more digital original photography, it's crucial that we know how to preserve digital images for the long term.

interpretive information

Electronic collection data can include interpretation by curators, ranging from the most basic (understandable by school-age children) to a level suitable for specialized researchers and scholars. Interpretation is particularly important for electronic records that are accessible to the general public — for example, through online exhibitions.

A key question facing all Smithsonian collecting units was determining the appropriate level of interpretation to provide for different objects and collections. Some collecting organizations have chosen not to include any interpretation at all in their digital records. The Library of Congress, for example, decided that its role as a repository did not include interpretation. By narrowing the scope of the information it provided, the Library of Congress has been able to concentrate on getting the basic data on more of its collection into digital format.

metadata records

“Metadata” refers to information that allows an object record to interface with a (digital) database. In other words, metadata provide the foundation for linking

databases and other electronic information.²⁹ Different types of metadata allow users to search and sort objects in terms of particular elements across multiple collections.

To be useful, metadata must be standardized or mapped across databases and collecting units. For this reason, metadata standards (also called *data structure standards*) have been created to define what types of information belong in a database, as well as the structure of this information. For example, museums use *cataloguing standards* to ensure consistent cataloguing and *interchange standards* to enable computer systems to communicate with each other. Both private and public organizations have prepared guidance on standards to support specific communities or interests. Some examples of metadata standards include Machine-Readable Cataloging (MARC) standards; Library of Congress Subject Headings (LCSH); Getty Arts and Architecture Thesaurus (AAT), and Dublin Core Metadata Initiative (DCMI).

To share information among the broadest possible community of users, collecting units must make their information available in accordance with a number of related metadata standards. Alternatively, a so-called “crosswalk” for mapping one metadata standard onto another can be used. While tedious to establish, crosswalks make elements defined in one metadata standard available to communities using related but not identical standards.

At the time the research for this study was completed, the Smithsonian had no Institution-wide set of metadata standards. However, the Media Technology Working Group, an OCIO-appointed Smithsonian committee, was conducting a concept test of what one interviewee described as “a metadata repository to bring together different resources and diverse collections.” One participant noted that initial results looked promising, and if successful, the project could significantly affect Smithsonian digitization standards.

²⁹ See Gilliland-Swetland, n.d.

collaboration in natural history digitization

There are about 3 billion animal and plant specimens in natural history collections worldwide. With only 3 to 5 percent of these specimens digitized, many organizations are now making efforts to put more information online (Whiting 2002). Unfortunately, formats have varied, making it difficult for researchers to make optimal use of the digital resources. When integrated, these shared data will comprise a priceless information resource that will surely play a vital part of the search for solutions to a variety of economic, ecological, environmental, and human health problems.

According to Wheeler, Raven, and Wilson (2004):

Our generation is the first to fully comprehend the threat of the biodiversity crisis and the last with an opportunity to explore and document the species diversity of our planet . . . Society's investment for centuries in great natural history collections can now be repaid through a powerful taxonomic research platform connecting researchers, educators and decision-makers. The grand biological challenge of our age is to create a legacy of knowledge for a planet that is soon to be biologically decimated. To meet it, 21st-century taxonomists and museums must have the right tools (285).

With technology finally available to support such tools, a variety of consortia are now sharing information on natural history specimens. NMNH plays an important role in many of them. One example is the Tree of Life (<http://tolweb.org/tree/>), a collaborative biodiversity Web project by biologists from around the world with more than 2,600 Web pages. The Global Biodiversity Information Facility (GBIF) (<http://www.gbif.org/>) is another up-and-coming Web resource that aims to provide a central portal to biodiversity data. A GBIF user concerned about a suspected invasive insect could, for example, perform a search to locate specimens, images, and life-history information from a host of different museums around the world. Other important consortia include the North American Biodiversity Information Network, Inter-American Biodiversity Information Network, and US National Biology Information Infrastructure.

collections digitization: status and progress

Progress on digitization varied across Smithsonian collecting units. In some cases, units continued to face an enormous task. According to an estimate provided in response to the FY2000 OP&A survey, for example, it will take NMNH more than 16,000 person-years of work to get basic registrarial documentation on all of its collections into its CIS. Another interviewee commented on the challenges of ensuring the accuracy of electronic records in large collections:

[We] face immense obstacles in completing our CIS goals. We must update and correct our existing records to ensure they will have the authoritative information that is expected of a national museum. That is an immense amount of data entry that requires the knowledge of trained subject experts. It is estimated that it would take 2,150 person-years to complete the basic inventory of current collections.

NCP reports annually on the progress of CIS record creation. As illustrated in Table 6, which draws from its data, as of FY2002 electronic records existed for about 17 percent of all Smithsonian object collections, and about 8 percent of these collections were available to the public online. Of all digitized records in units with object collections, 30 percent were available to the public, or 12.3 million out of 29.3 million.³⁰ Estimates for FY2004 and FY2005 foresaw increases of 250,000 records per year. As indicated in the table, most electronic records contained little more than basic data; only 2 percent included descriptive content that exceeded the minimum inventory and registrarial standards established by the units and NCP.

³⁰ Note that, for reasons explained in the notes to Table 6, records and objects reported to NCP do not necessarily match up on a one-to-one basis. For example, a unit may have electronic records for some objects not reported to NCP, or a single object reported to NCP may be represented by more than one electronic record.

Much of the emphasis within the Smithsonian was on enriching basic electronic records with research data, images, and other information, as well as correcting and updating records transferred from legacy systems, rather than on increasing the

Table 6. Percentage of Object Collections Digitized and Accessible to the Public, by Unit, FY2002

Museum/ archive/ library	Collection total (number)	Collections represented by electronic records ^a (%)	Records with enhanced information (%)	Collections available to the public (%)
Smithsonian, total	143,538,924	17	2	8
Art				
C-HNDM	203,075	100	11	98
FSG	32,111	116	46	4
HMSG	11,493	100	66	100
NMAfA	8,247	100	7	7
NPG	18,874	98	5	64
SAAM	39,308	94	n.a.	87
Cultural history				
AM/CAAHC	7,711	8	0	0
NASM	45,041	113	17	2
NMAH	3,176,737	19	0	0.12
NMAI	779,319	68	0	0
NPM	13,358,437	32	9	0
Natural science				
NMNH	125,808,564	18	4	9
NZP	2,714	100	8	0 ^b
Central units				
AHHP	3,241	100	53	2
HSD	34,109	6	95	84
SIA	24,279	38	1	n.a.

Source: National Collections Program, FY2002 data.

n.a. Not available.

a. Several reasons explain why this percentage exceeds 100 for some units: (1) duplicate records may exist for the same object; (2) records on an object may be kept in the database after that object has been deaccessioned; (3) objects not in a unit's collection may receive a record if held on long-term loan; and (4) records reported to NCP may exist in systems other than the museum's main CIS.

b. NZP shared information with associate zoos, but the public did not have access to this information.

number of basic electronic records. According to some interviewees, enhanced and corrected records were important to almost all users and particularly crucial for fulfilling the public access function of digital records. One interviewee put it this way: “The public doesn’t want raw data; it wants intellectually structured presentations in a language it can understand.” However, as noted, relatively few Smithsonian electronic records had the images and interpretive content that public users valued; most records contained only object-level descriptions and few stand-alone “ideas” or stories. This relative dearth of content-rich records may sometimes skew the selection of objects for online exhibitions. Objects may be chosen not because they are the best or most representative items, but because they happen to have the required information in digital form. As one Smithsonian interviewee commented on a popular online exhibition: “They aren’t the collections we [would have preferred]; it isn’t a representative group. It’s not the best selection, but the ones we had photos and text for.”

Not all interviewees agreed with the emphasis being placed on the development of enhanced records. Some believed that this focus was the result of staff interests — that is, some collections research personnel found it more appealing to work on enhancing records than on creating basic ones. Moreover, interviewees pointed out that not all users care about expanded information. Potential borrowers, for example, often simply want to know what the museum holds.

Creating enhanced records is a very resource-intensive process. An interviewee at one museum suggested that enhancements might take roughly twice as long as the creation of basic records; others suggested much more time would be required.

content and audience: unanswered questions

Uncertainties about exactly what electronic records should contain, and which types of users they should target, complicate the task of documenting the Smithsonian's vast collections in electronic format. Several interviewees spoke of a failure of individual units to establish priorities with respect to what they should digitize, or to define criteria for making digitization decisions. As one interviewee noted, "electronic access to 100 percent of the collections may be the goal, but it's not feasible."³¹

Without clear direction on issues of content and audience at the Institutional level — or often even at the unit level — many staff appeared to be puzzled about the larger purpose of digitization efforts, particularly as they pertained to public access. The Smithsonian has focused on internal staff such as registrars and curators and, in some cases, on external researchers. It has paid little attention to the third user group, the general public. One interviewee put it this way: "Why are we computerizing? Who is it for? The registrar has one set of uses, the curators another, the administrators another. Sometimes people talk about public access, but never for whom." Another interviewee also asked "who is it for?" and then elaborated:

If we are doing it for ourselves, we can tolerate the differences [across the Institution]. If we are automating for public access, then we need to define our audiences, what information should be recorded, who we are recording information for, how it should be structured, and how to put it back out. We should be asking the same questions we ask of exhibitions. The museums have not talked it through individually or collectively.

³¹ The reference to 100 percent of the collections does not include those collections where security, privacy, or cultural sensitivity issues are present. For example, NMNH holds collections of human remains that will likely never be available electronically.

A recent Institute of Museum and Library Services (IMLS) survey provided some insight into the question of public access at museums and libraries (Institute of Museum and Library Services 2002).³² The results indicated that 47 percent of museums with digital collections allowed public access, primarily through the Internet (76 percent).³³ Respondents defined their primary target audiences for digital records as “anyone with Internet access” (61 percent); “researchers/scholars” (46 percent); and “staff members” (35 percent).

Examining website activity can provide valuable insights into the public’s interest in online access to collections items. For example, in 2003, FSG introduced 1,389 collections objects to its website, and public response has been positive. Figure 4 shows that the average visitor session time increased noticeably after these objects became available online.³⁴ Further, while the median visitor session length on all FSG Web pages was 1 minute, 50 seconds, the median visit length on those pages dedicated to collections was 3 minutes, 38 seconds. That is, when visitors are provided with more collections content, they appear to spend more time on a unit’s site. Interestingly, FSG has done little to publicize its online collections.

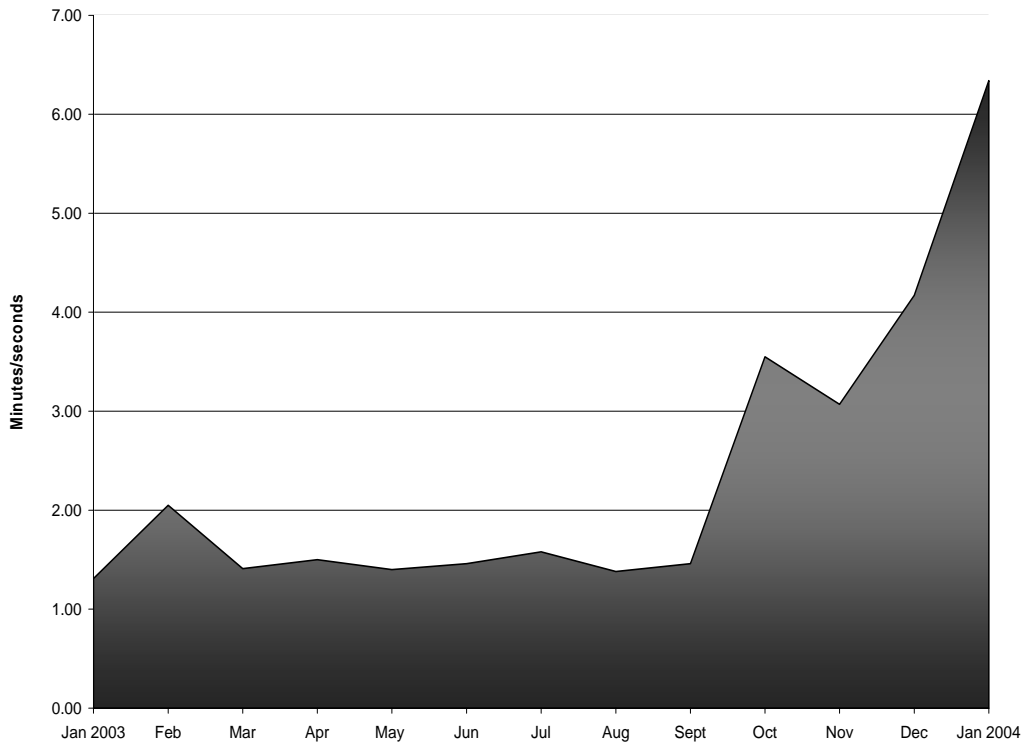
While interest in FSG collections online has continued to flourish, the unit’s progress in adding records may be impeded. FSG lost its sole TMS staff person in 2003 due to budget cuts. While remaining staff continued to work on the CIS database, they lacked the expertise to translate information for the website. FSG worried that online visitors might be discouraged from returning to the site if little new information is added.

³² IMLS sent 2,836 surveys to museums, public libraries, academic libraries, and state library administrative agencies. The overall response rate was 25 percent, with a 22 percent response rate from museums. More than half the museums surveyed (67 percent) had budgets of less than \$250,000.

³³ Other methods for public access included the museum’s own computer network (52 percent) and a third party host (less than 7 percent).

³⁴ The collections were added in the spring of 2003, but the pages were not tracked in the FSG WebTrends profile until the fall of 2003, because technology upgrades that would have enabled such tracking were not available at FSG until the fall of 2003.

Figure 4. Average FSG Online Visitor Session Length, January 2003 to January 2004



Source: OCIO WebTrends data.

CONCLUSIONS

Smithsonian collections have multiple uses, and the relative attention paid to them uses has been profoundly influenced over time by the shifting interests, strategies, and priorities of different Institutional leaders. However, these interests, strategies, and priorities have tended to be superimposed on top of each other, ultimately resulting in a tendency to try to serve simultaneously all types of uses, by all kinds of users. Smithsonian collecting units lacked the resources to carry out this grand comprehensive approach; data on the status of collection

documentation and barriers to access alone made that point clearly. The need for prioritization and focus has become urgent because of the ongoing investment in electronic access, which can, if allowed, become a black hole for resources. It is critical that the Smithsonian and the units be very clear about the primary purpose and target audiences for their collections, so as to use scarce resources to maximum effect.

uses of collections

Although all collections are used in multiple ways, a particular use generally dominates. At one extreme are archives, libraries, and natural history collections, which are held as reference for present and future research, even though a small percentage of items might be suitable for display. At the other extreme are most art museums, where exhibition is the major use and significant objects are too rare and expensive to be gathered in quantities sufficient to form meaningful reference collections.

Within the context of mission, vision, and history, an individual collecting unit has considerable leeway in deciding which uses will be the major focus of its collections. A history museum, for example, may decide to fully document particular events as a basis for research, or it may instead opt to assemble a select grouping of exceptional objects likely to resonate with visitors, regardless of the objects' research value. In the current environment, when many museums tend to publicly justify themselves in terms of their visitors rather than their contributions to research, display uses have attracted more attention and support than research and reference uses.

Although the different Smithsonian collecting units have implicitly taken different positions with respect to the principal uses of their collections, they have generally not developed clear, explicit statements of priorities among uses. Yet if priorities are

not made clear, tensions inevitably result, because not all uses are compatible with one another, nor can they all be fully developed within the context of available resources. Failure to identify priorities can lead to an inefficient scattering of attention and resources — as, for example, when a museum whose collections are primarily for reference use allows exhibitions to siphon away resources that might be better spend on collections care, or, conversely, when a museum that emphasizes exhibition uses maintains holdings well in excess of what is necessary to support exhibitions.

The identification of priorities among uses also affects how units develop their collections. Each use has its own growth dynamic. Whenever the reference and research use dominates, for example, there is a strong tendency to add to the collections and “fill in the gaps” that always exist in encyclopedic assemblages. In a reference collection, nearly everything that can be identified within the schema governing the collection’s composition is a candidate for inclusion. Collecting plans can play an important role in shaping how these collections develop.

users of collections

In line with the primary uses of their collections, Smithsonian collecting units have different user profiles. For example, the mission of SIL is to serve internal staff, and NMNH is predominantly a research museum (which does, however, have a strong but secondary obligation to make its collections available to the public in different ways). Others rightly focus on the general public. At present, the OP&A study team sees little thoughtful planning that identifies and prioritizes target users, defines the appropriate balance among them, and assesses the relative costs and benefits of different means of reaching them. Is it appropriate, for example, for a collecting unit with a primarily research mission to spend millions of dollars on public programs that may not be closely linked with its work — especially if this drains resources

from collections care and research? Are creating basic records and a complete catalogue more or less important than enhancing existing records? If access is a priority, to what extent is it appropriate for the central administration to centralize planning and set standards for websites, metadata, and the like? What level of resources should go to access relative to other functions?

access to collections

There is a need to plan wisely when it comes to providing access to collections, because access — particularly the creation of space to display collections, the intellectual enhancement of collection records, and the provision of effective electronic access — can be very expensive. To reiterate the conclusion made above, the critical need is better planning, based on a clear statement of priorities with respect to uses and users. Implementation of a use and access plan likely will require strong leadership, as it may entail hard decisions and demand an ability to stay the course when advocates of lower priority uses clamor for attention and resources.

The OP&A study team believes that collections digitization is a particularly important access issue at this time. Relatedly, the rise of electronic access via the Web raises challenging prioritization issues, and planning and investment in this area are still in their early stages. WebTrends data clearly indicate there is strong public interest in the Smithsonian's Web presence, and the potential for pouring resources into this area is practically limitless. What is the appropriate level of support? What limits should different collecting units establish, given their missions, priorities, and target users?

The OP&A study team also believes that a single portal that provides access to collections information across the Smithsonian should be a priority, because it would significantly enhance access by all types of users. Aside from the technological

challenges involved, implementing a single portal will require development and application by all units of a common Institution-wide thesaurus to facilitate database searches across all Smithsonian collections databases.

prioritizing the digitization process

Establishing, updating, and deepening electronic information on collections is a major project. But for many Smithsonian units, progress has been slow and unsystematic. Two points must be emphasized in this connection. First, other activities are always competing with digitization for resources, and as of this writing, digitization has tended to lose out to other priorities. If unit and Smithsonian leadership lack a clear commitment to digitization efforts, these efforts are likely to falter as resources are diverted to more pressing, better established, or better articulated priorities.

Second, the potential scope of digitization is so vast that it is impossible to do *everything* that might be done. However, units have tended to approach their digitization efforts unsystematically. Realistic plans with clear priorities do not currently exist at many units. Such plans are necessary — both to determine the most important goals of digitization at individual units, taking key uses and users into account, and to ensure that digitization efforts receive sufficient resources to move forward at a reasonable pace. Some units are making progress toward this end. For example, to prioritize the formidable task of digitizing its massive collections, NMNH has adopted a policy that makes digitizing type collections the first order of business. Implicit in this policy is a definition of *who* electronic access at NMNH is primarily meant to serve (the natural history research community) and *what* the electronic records ought to contain (information sufficient to allow species identification).

Each Smithsonian unit needs to have a sense of the purpose and goals of digitization, in light of its mission and associated collections uses. This means defining the needs of users, in order of priority, as a basis for determining which objects should be digitized first and the depth of the information required. Significance assessments and profiling are two useful tools for identifying priorities.³⁵ It is also important to know what records and information are available elsewhere, so as not to duplicate them — particularly when links to other organizations' sites could adequately serve the needs of Smithsonian users.³⁶ To digitize without such guidelines risks squandering resources on tasks of limited relevance and value. Focusing on priority tasks offers greater assurance that key needs will be met. Other museums will benefit, as NMNH has, from a greater degree of clarity about the purpose and priorities of digitization. Of course, discipline is still needed to adhere to plans and priorities.

Although each unit must ultimately fashion its own digitization plan, opportunities exist for collaboration and leveraging of resources, both across units and with outside entities. The units have generally not taken advantage of these opportunities. Because digitization and electronic access can be very expensive, the units may be forgoing large benefits.

Beyond the units, it is also important that the central Smithsonian administration define the level of priority the units should accord digitization, and identify where a more centralized approach offers significant benefits. Not only does a substantial amount of funding for digitization come from OCIO's budget, but the units take their strategic direction from the central administration. Moreover, the units are more likely to develop plans and priorities and adhere to them if directed to do so by central Smithsonian management and held accountable for the results.

³⁵ These tools are discussed in Chapters 4 and 5.

³⁶ It should be noted, however, that multiple data points and multiple interpretations are important for biological materials — at least for all but the most common and widespread taxa. Additionally, even if duplicate specimens from the same tree are digitized, additional or different information may be captured, such as identification history. This could be particularly useful to researchers.

Establishing a functioning central electronic CIS, with records tailored to the specific needs of the primary users of a unit's collections, should be a high priority at all Smithsonian units. This need is unlikely to be met unless it is made an Institution-wide objective with a defined target date for accomplishment, it becomes a priority in resource allocation, and the units come to accept that radical actions may be needed — such as shifting resources from other programs — until the job is complete.