

Capability Profiles of Exhibit Departments



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Office of Policy and Analysis

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Preface

Capability Profiles of Exhibit Departments identifies and describes sets of characteristics of each of 23 Smithsonian exhibit departments. This compendium does not compare and contrast the departments, does not draw inferences, and does not link the attributes to measures of success. Nevertheless, the Office of Policy and Analysis (OP&A) staff believes that sharing the information is worthwhile both in the spirit of learning and as an impetus for greater collaboration among units.

The data are based on answers to a survey administered by OP&A in 2001. The information is presented herein for thoughtful consideration and has, we assume, changed somewhat in 2002.

As with many of our data collection efforts, the information is expected to provide inputs into the exhibition study OP&A is working on. The compendium is the first of many publications related to exhibits that we will share with you during the next several months, prior to issuance of our study incorporating major findings and recommendations.

I would like to thank all of my staff for their assistance in the preparation of these profiles. In particular, I would like to thank Kerry DiGiacomo who broke the data down into useful categories and re-assembled it.

Carole Neves
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List of Acronyms

A&I	Arts and Industries Building
AAA	Archives of American Art
CAAHC	Center for African American History and Culture
CHNDM	Cooper-Hewitt, National Design Museum
FSG	Freer Gallery of Art and the Arthur M. Sackler Gallery
HMSG	Hirshhorn Museum and Sculpture Garden
HSD	Horticulture Services Division
IG	International Gallery
NASM	National Air and Space Museum
NMAfA	National Museum of African Art
NMAH	National Museum of American History, Behring Center
NMAI	National Museum of the American Indian
NMNH	National Museum of Natural History
NZP	National Zoological Park
NPG	National Portrait Gallery
NPM	National Postal Museum
OEC	Office of Exhibits Central
OIPP	Office of Imaging, Printing, and Photographic Services
OPP	Office of Physical Plant
SAAM	Smithsonian American Art Museum
SIA	Smithsonian Institution Archives
SISC	Smithsonian Institution Service Center
SIL	Smithsonian Institution Libraries
SITES	Smithsonian Institution Traveling Exhibition Service
STRI	Smithsonian Tropical Research Institute
TSA	The Smithsonian Associates

Anacostia Museum and Center for African American History and Culture

Background

The Anacostia Museum opened in 1967. Founded as a neighborhood museum, it moved into its own facility in 1987 that was subsequently renovated and re-inaugurated in 2002. The Museum has expanded its mission to examine, preserve, and interpret African American history and culture, not only locally and regionally, but nationally and internationally as well. The Center for African American History and Culture (CAAHC), administered by the Anacostia Museum, broadens the outreach of the Smithsonian in these areas. Its offices are located in the Arts and Industries Building.

The Anacostia Museum and CAAHC is organized under the Smithsonian's American Museums and National Programs division (AMNP).

Facility

The Anacostia Museum and CAAHC has 31,000 square feet (sf) in total assignable organization space; 24,000 sf is located at the Anacostia Museum building and 7,000 sf consists of off-site storage in Columbia, Maryland. The public-use area at the Museum totals 7,200 sf. Space dedicated exclusively to exhibitions totals 5,000 sf and mixed-use space (for exhibitions as well as other public uses) totals 2,200 sf. A possible 7,200 sf is available for temporary exhibitions at the Museum. The Museum and CAAHC does not anticipate any increase or decrease in public-use space in the near future.

The Anacostia Museum and CAAHC has 3,360 sf of non-public space designated for exhibition support. Most of that area is occupied by graphics/art production (1,500 sf). Other in-house functions with designated space are: storage (500 sf), object packing (500 sf), design/detailing (500 sf), and photography (360 sf). The Museum and CAAHC does not anticipate any change in the amount of support space in the near future.

Exhibition Activity

During Fiscal Years (FYs) 1999 and 2000, the Museum opened one exhibition, *Reflections in Black*.

Size and Content of Exhibitions

Reflections in Black occupied 5,600 sf of space at the Arts and Industries Building. The exhibition displayed 286 objects, with none from Smithsonian collections. On average, the exhibition displayed five objects per 100 sf.

Exhibition Costs

Reflections in Black cost \$284,000 out-of-pocket¹ (\$50.71 per sf). Costs for exhibition-related staff, including salary and benefits, were \$500,000 in FY99-00.²

¹ All expenditures discussed here include only exhibition-related costs and do not include: in-house staff, overhead costs, publications, brochures, public programs, and advertising.

² Extrapolated from FY00 staff costs.

Collaboration and Contracting

The OP&A questionnaire listed 36 exhibition-related services. Of those, the Museum contracted eleven services for *Reflections in Black* and one service was provided by another Smithsonian unit.

For those exhibition-related services³, the Museum paid contractors \$282,243 and reimbursed the Smithsonian unit \$1,757.

Exhibitions Staff

The Museum and CAAHC has 25 full-time equivalent (FTE) staff, including 3.5 exhibition-related FTEs (14% of all FTEs). Total costs for these exhibition-related staff were \$250,000 in FY00. There were no training expenditures for exhibition-related staff in FY00.

The Museum and CAAHC reported the time spent (in FTEs) during FY00 by exhibition-related staff on each of 25 activities listed by OP&A.⁴ The exhibitions staff work in seven areas: curator/researcher, graphic design, management, photography, project management, registrar/collections, and writing.

Exhibition Design and Production Capability

Over the past three years, the Museum and CAAHC did not perform any exhibition design work in-house. Less than one percent of its graphic design work was done in-house. It did not use detailers to prepare production drawings.

The Museum and CAAHC would like to be able to get on the schedule at the Office of Exhibits Central (OEC) for their design services.

The Museum and CAAHC does not have any production capability. It would like to have access to the mannequin, model-building, and mount-making services at OEC and the general structural production services of the Office of Physical Plant.

The Museum and CAAHC does not have an in-house audiovisual or multimedia production capability, but it would like access to the production development services elsewhere at the Smithsonian.

Principal Strengths and Weaknesses

The Museum and CAAHC reports that its greatest strength related to creating and presenting exhibitions is:

- Content development.

The Museum and CAAHC reports that its three greatest weaknesses related to creating and presenting exhibitions are:

- Its small staff,
- Lack of exhibition maintenance, and
- Lack of technological expertise.

³ Services included research, design, and production services.

⁴ Units were invited to list additional activities as appropriate.

Archives of American Art

Background

The Archives of American Art (AAA) was founded in 1954 and became a part of the Smithsonian Institution in 1970. It provides researchers with access to the largest collection of documents on the history of the visual arts in the United States. The collection totals more than thirteen million items, consisting of the papers of artists, dealers, critics, art historians, curators, administrators and the records of art dealers, museums, and other art-related businesses, institutions, and organizations. AAA reports to the Under Secretary for AMNP.

Facility⁵

AAA has 20,120 square feet (sf) in total assignable organization space; 13,500 sf is located at the main location in Washington, DC, 4,864 sf in New York City, and 1,756 in San Marino, California. The public-use area totals 950 sf at the main location, 1,189 sf in New York, and 184 sf in San Marino. Space dedicated exclusively to exhibitions totals 553 sf, all located at the New York location; this space is also available for temporary exhibitions. AAA expects an increase of 208 sf for exhibition display in the near future. AAA has no non-public exhibition support space.

Exhibition Activity

During Fiscal Years (FYs) 1999 and 2000, AAA originated and opened six exhibitions.

Size and Content of Exhibitions

FY99-00 exhibitions occupied 3,318 sf of space. All of the exhibitions were the same size, 553 sf. Exhibitions displayed 315 objects; 276 (88%) were from Smithsonian collections. On average, exhibitions displayed nine objects per 100 sf.

Exhibition Costs

Exhibitions opening in FY99-00 cost \$21,499 out-of-pocket⁶. The highest cost per square foot for an exhibition was \$26.50 for *The Critic Sees*. The lowest cost per square foot for an exhibition was \$3.58 for *In Sight: Portraits of Folk Artists by Chuck Rosenak*. The mean cost per square foot for the six exhibitions was \$6.48. Costs for exhibition-related staff, including salary and benefits, were \$92,208 in FY99-00.⁷

Collaboration and Contracting

The OP&A questionnaire listed 36 exhibition-related services. On average, four of the services listed were contracted for each AAA-originated temporary exhibition, less than one service was provided in-kind by an outside organization and/or individual, and three services were provided by another Smithsonian unit.

⁵ All square footage reflects space prior to the Patent Office Building closure in January 2000.

⁶ All expenditures discussed here include only exhibition-related costs and do not include: in-house staff, overhead costs, publications, brochures, public programs, and advertising.

⁷ Extrapolated from FY00 staff costs.

For those exhibition-related services⁸, AAA paid contractors \$18,561 and reimbursed other Smithsonian units \$6,313. Other Smithsonian units also provided in-kind support estimated at a value of \$500. Outside organizations and/or individuals provided in-kind support estimated at \$2,500.

Exhibitions Staff

AAA has 32 full-time equivalent (FTE) staff, of which just 0.6 FTEs are exhibition-related (2% of all FTEs). Total costs for these exhibition-related staff totaled \$46,104 in FY00.

AAA reported the time spent (in FTEs) during FY00 by exhibitions-related staff on each of 25 activities listed by OP&A. AAA exhibitions staff work in five areas: management/administration, project management, curators/researchers, writing/editing, and marketing/public affairs.

Exhibition Design and Production Capability

AAA has no design capabilities. It would like to have use of the photo reproduction and digital imaging capabilities at the Office of Physical Plant.

For exhibit fabrication, AAA has book cradle building capabilities that it uses 5% of the year and archival mount making for documents that it also uses 5% of the year.

AAA has one audiovisual capability with analog recording on-location equipment that it uses 50% of the year. AAA also has the following equipment: three VCRs, one CD player, and one CD controller. AAA would like to have a digital MiniDisk player/recorder, a digital controller, and use of the sound editing equipment at SI Productions.

Principal Strengths and Weaknesses

AAA reports that its three greatest strengths related to creating and presenting exhibitions are:

- The quality and depth of its holdings,
- Skill and experience of the staff and their knowledge of the collections, and
- Its ability to produce engaging online exhibitions on its Web site.

AAA reports that its three greatest weaknesses related to creating and presenting exhibitions are:

- Its lack of planning money,
- Inability of the Washington staff to fulfill regular duties when working on an exhibition at the New York location, and
- The expense of sending its Washington staff to New York.

⁸ Services included research, design, and production services.

Arts and Industries Building

Background

The Arts and Industries Building (A&I) opened in 1881 as the National Museum Building. Having housed several types of collections over the years, most notably objects from the 1876 Centennial Exposition, the museum now displays a series of changing exhibitions on a variety of topics. The A&I Building is a part of the Smithsonian's AMNP division.

Facility

A&I has 152,461 square feet (sf) in total assignable organization space at its historical building on the National Mall. The public-use area totals 28,502 sf. Space dedicated exclusively to exhibitions totals 15,000 sf and mixed-use space (for exhibitions as well as other public uses) totals 4,000 sf. A possible 19,000 sf is available for temporary exhibitions. A&I anticipates a decrease in public-use space of 5,000 sf in the near future.

A&I has no space designated for exhibition support.

Exhibition Activity

During Fiscal Years (FYs) 1999 and 2000, A&I opened eight exhibitions. A&I co-organized one exhibition, located in the Secretary's office, in collaboration with OEC. A&I served as the venue for four exhibitions created by other Smithsonian units and three exhibitions created by outside organizations.

A&I provides guidelines⁹ to Smithsonian units and outside organizations submitting exhibition proposals. The guidelines cover the exhibition theme and content, audience, logistics, budget, planning, schedule, and project personnel. A proposal cover page indicates the project status (planning, development, or complete) and lists the title, concept outline, exhibition contents, organizational affiliation, funding status, internal funding deadline, proposed opening and closing dates, and contact person. The director of the museum or other organization creating the exhibition must provide signature of approval. Proposals are reviewed monthly by a committee of Smithsonian subject matter experts, A&I exhibitions staff, a senior representative of the AMNP division, the executive advisor to the Secretary, and two members of Smithsonian units who advise on a rotating basis.

Size and Content of Exhibitions

FY99-00 exhibitions occupied 29,839 sf of space at A&I and in the Secretary's office. Exhibitions averaged 3,730 sf. Not including the Secretary's office, the largest exhibitions were *From Bento to Mixed Plate* (4,800 sf), *Gifts from the Desert* (4,800 sf), *Artists at Work* (4,800 sf), and *Rhythms of Identity* (4,200 sf). The smallest was *Paper Road Tibet* at 400 sf. Exhibitions displayed 708 objects; 144 (16%) were from Smithsonian collections. On average, exhibitions displayed two objects per 100 sf.

⁹ Guidelines were last issued in September 1999.

Exhibition Costs

The A&I exhibitions office has no expenses related to producing exhibitions except those related to staff. Costs for exhibition-related staff, including salary and benefits, were \$310,000 in FY99-00.¹⁰

Collaboration and Contracting

The OP&A questionnaire listed 36 exhibition-related services. On average, less than one of the services listed was provided by another Smithsonian unit for each Smithsonian-originated exhibition. For each venue-only exhibition created by an outside organization, an average of one service was provided by another Smithsonian unit.

Exhibitions Staff

A&I has two full-time equivalent (FTE) staff, one working as a full-time manager and one working as a full-time project manager. Total costs for these staff were \$155,000 in FY00. There were no training expenditures for exhibition-related staff in FY00.

Exhibition Design and Production Capability

A&I has no in-house design or production capability. However, there are some pieces of equipment it would like to have. For exhibition design, A&I would like to have a large copier and designing software. It would like to use the large design copier at the National Museum of American History (NMAH).

Principal Strengths and Weaknesses

A&I reports that its three greatest strengths related to creating and presenting exhibitions are:

- Timeliness – its ability to rotate exhibits on an accelerated schedule,
- Coordination and management skills, and
- Its ability to work on several exhibits at once.

A&I reports that its three greatest weaknesses related to creating and presenting exhibitions are:

- Not enough staff,
- No support space, and
- No budget or financial support.

¹⁰ Extrapolated from FY00 staff costs.

Center for Folklife and Cultural Heritage

Background

The Smithsonian Center for Folklife and Cultural Heritage (Folklife) promotes the understanding and continuity of contemporary grassroots cultures in the United States and abroad. Folklife produces the Smithsonian Folklife Festival, Smithsonian Folkways Recordings, *Smithsonian Folklife Studies* (a scholarly monograph series), exhibitions, documentary films and videos, and symposia. It conducts ethnographic and cultural policy-oriented research, maintains a documentary archival collection, provides educational and research opportunities including education kits on a variety of products in collaboration with various educational publishers, and offers fellowships and internships and training programs for teachers and community scholars. Folklife reports to the Under Secretary for American Museums and National Programs.

Facility

Folklife has 19,000 square feet (sf) in total assignable organization space located in the Victor Building and utilizes 670,000 sf of space on the National Mall for each summer's Festival. The public-use area at the Festival site is 650,000 sf and at the Archives Reading Room in the Victor Building public-use space totals 1,200 sf. Space dedicated exclusively to exhibitions totals 275,000 sf. Mixed-use space (for exhibitions as well as other public uses) totals 650,400 sf, of which 400 sf are at the Victor Building.¹¹ There is no space available at its main location for temporary exhibitions, but Folklife does have the Festival site with 650,000 sf annually. Folklife does not anticipate any increase or decrease in public-use space in the near future.

Folklife has 15,702 sf of non-public space designated for exhibition support. Most of that area is occupied by the exhibition space construction on the National Mall (8,000 sf) and material storage for the Festival (7,000 sf). Other in-house functions with designated space at the Victor Building are: design and detailing (150 sf), graphics and art production (280 sf), audiovisual/multimedia production (200 sf), and film production (72 sf). Folklife does not anticipate any increase or decrease in support space in the near future.

Exhibition Activity

Folklife follows a production schedule that spans the seven months leading up to each Festival. The schedule identifies key dates, the activities of the date or milestone, and the staff involved. Examples include photography deadlines, planning meetings, and contract negotiations.

During Fiscal Years (FYs) 1999 and 2000, Folklife hosted two Festivals. Folklife developed the *Smithsonian Folklife Festival 1999*, with the National Park Service (NPS), Celebrate New Hampshire, The Romanian Cultural Foundation, and the South African Ministry of Culture, among others, and the *Smithsonian Folklife Festival 2000*, with NPS, Center for Tibetan Art and Culture, District of Columbia Commission for the Arts and Humanities, the University of New Mexico, and the U.S. Department of Agriculture, among others.

¹¹ Folklife displays artifacts and artwork in its office hallways and conference rooms.

Size and Content of Exhibitions

FY99-00 exhibitions occupied 550,000 sf of space on the National Mall. Both festivals occupied the same area (275,000 sf) on the National Mall. There is no accurate record of the number of objects at each festival.¹²

Exhibition Costs

Folklife utilizes a 'Preliminary Program Budget and Spending Plan' to manage funds for the Festivals. Income in, income pledged or solid, and income projected are recorded for federal funds, Smithsonian trust funds, outside grant sources, outside gift sources, and in-kind donations. From this, the funds sought are calculated. For each income source, expenditures are tracked in seven areas: salary and benefits, travel, transport, rental and communications, printing, supplies, and other (contractors and room and board).

Exhibitions opening in FY99-00 cost \$2,630,000 out-of-pocket.¹³ The mean cost per square foot for the two Festivals was \$4.91. Costs for exhibition-related staff, including salary and benefits, were \$2,200,000 in FY99-00.¹⁴

Collaboration and Contracting

The OP&A questionnaire listed 36 exhibition-related services. Of those, an average of 13 services were contracted for each Festival, 21 services were provided in-kind by an outside organization and/or individual, and six services were provided by another Smithsonian unit.

For those exhibition-related services¹⁵, Folklife paid contractors \$2,700,000 and reimbursed Smithsonian units \$70,000. Other Smithsonian units also provided in-kind support estimated at a value of \$60,000. Outside organizations and/or individuals provided in-kind support estimated at \$1,800,000¹⁶.

Exhibitions Staff

Folklife has 51 full-time equivalent (FTE) staff, including 13.5 exhibition-related FTEs (26% of all FTEs). Total costs for exhibition-related staff were \$1,100,000¹⁷ in FY00. Training expenditures for exhibition-related staff in FY00 totaled \$2,000.¹⁸

Staff working on exhibitions are distributed throughout the organization. Four departments report to the Director (Administration and Finance, Smithsonian Folklife Festival, Cultural Heritage Policy, and Smithsonian Folkways). Cultural Research and Education, as well as Development, report to the Deputy Director. The Smithsonian Folklife Festival department is divided into program, publications, technical divisions, and participant coordination.

¹² The number of objects on exhibition is estimated in the thousands since there were approximately 600 participants at the Festival in 1999 and 1,100 participants in 2000.

¹³ All expenditures discussed here include only exhibitions-related costs and do not include: in-house staff, overhead costs, publications, brochures, public programs, and advertising.

¹⁴ Extrapolated from FY00 staff costs.

¹⁵ Services included research, design, and production services.

¹⁶ Folklife received outside in-kind support estimated at \$1,200,000 for the 1999 Festival and \$600,000 for the 2000 Festival.

¹⁷ This number includes temporary staff.

¹⁸ Not including on-the-job in-kind training.

Folklife reported the time spent (in FTEs) during FY00 by exhibition-related staff on each of 25 activities listed by OP&A. Folklife exhibitions staff work in the following areas: management/administration, project management, curators/researchers, exhibition design, writing/editing, photography, graphic design, lighting design, engineering/architecture, fabrication, audiovisual production, multimedia production, film production, graphics/art design production, lighting installation, installation, crating/packing, exhibition maintenance, visitor research, and marketing/public affairs. The following list includes activities covered by temporary workers: carpentry, plumbing, electrical work, logistics, volume, supplies, administration, festival participants, and program staff.

Exhibition Design and Production Capability

Over the past three years, Folklife performed 92% of its exhibition design work in-house and 97% of that work was rendered on computers. In addition, 100% of graphic design work was completed in-house and on computers. It did not use detailers to prepare production drawings. It provided design services to other Smithsonian units during the past three years.

Exhibition design and graphic design software used by Folklife includes: AutoCAD, Freehand, MiniCAD, Photo Shop, and QuarkXpress. Unusual in-house design equipment includes an HP Design Jet 500 plotter. For design, Folklife would like to have a color laser printer, updated software, new PMS books, typefaces, and a laminator. It would like to have use of Office of Imaging, Printing, and Photographic Service's (OIPPS) high-resolution scanner for design and OEC's silkscreening for graphic production.

Folklife does have some fabrication capabilities including: general structural production, stonework, electrical work, plumbing, painting, wall construction, scenic production, and specialized Festival fabrications, all of which are in use 25% of the year. The outdoor art installation capability is in use 15% of the year. Folklife has not used its fabrication equipment to provide services to any other Smithsonian unit in the last three years. It would like to have a CNC router and the use of the Office of Physical Plant's (OPP) machinery, carpentry, and electrical shops.

Neither of the *Smithsonian Folklife Festivals* employed computer interactives in the exhibits. Folklife does have the following audiovisual capabilities: analog film/video recording on-location, digital audio recording on-location, editing film/video broadcast (90% of the year), digital sound editing, and design and installation of audiovisual spaces and multimedia artworks. It would like to have the full capabilities to pre-master CDs and digitalize sounds recordings. Folklife has an audio cube mastering system and a digital video editing suite. Over the past three years, Folklife has provided this equipment to other SI units. Folklife would like to add the following multimedia equipment: broadcast quality video camera, smaller digital video units for field work, media compression software, drive space, DVCAM studio deck, audio field mixer, stage lights, multi-standard dubbing unit, and a PAL-BETACAM deck, as well as use of SI Production's editing systems, lights, film camera, audio system, OPP's 35mm lenses, and National Museum of Natural History (NMNH) Audio Visual's mini DVD video camera.

Principal Strengths and Weaknesses

Folklife reports that its three greatest strengths related to creating and presenting exhibitions are:

- Excellent collaboration with the people and organizations being represented,
- Dedicated, knowledgeable staff, and
- Experience.

Folklife reports that its three greatest weaknesses related to creating and presenting exhibitions are:

- Receiving adequate resources in a timely manner,
- Coping with Smithsonian bureaucracy, and
- Dealing with the environmental constraints of working with external agencies like the National Park Service.

Cooper-Hewitt, National Design Museum

Background

The Cooper-Hewitt, National Design Museum (CHNDM), founded in 1897 as part of The Cooper Union for the Advancement of Science and Art, has been part of the Smithsonian since 1967. It currently occupies the Andrew Carnegie Mansion on Fifth Avenue in New York City and is part of the Smithsonian's International Art Museums division.¹⁹

Facility

CHNDM has 88,778 square feet (sf) in total assignable organization space; 85,370 sf is located at the main location and 3,408 sf is off-site at Crozier Fine Art (storage). The public-use area at the main location totals 20,648 sf. Space dedicated exclusively to exhibitions totals 9,661 sf and mixed-use space (for exhibitions as well as other public uses) totals 1,326 sf. There is a possible 9,661 sf available for temporary exhibitions. CHNDM does not anticipate any change in the amount of public-use space in the near future.

CHNDM has 4,603 sf of non-public space designated for exhibition support. Most of that area is occupied by conservation (1,517 sf) and exhibition fabrication (1,418 sf). Other in-house functions with designated space are: design/detailing (678 sf), crate/case storage (378 sf), object packing (372 sf), and photography (240 sf). CHNDM does not anticipate any increase or decrease in support space in the near future.

Exhibition Activity

During Fiscal Years (FYs) 1999 and 2000, CHNDM opened ten exhibitions. Six exhibitions were organized elsewhere, with CHNDM serving as a venue. CHNDM organized three exhibitions. One exhibition, co-organized with the Williams College Museum of Art, was not only on view at CHNDM, but is scheduled to travel to seven other venues.

Size and Content of Exhibitions

FY99-00 exhibitions occupied 38,500 sf of space at CHNDM. Exhibitions averaged 3,800 sf. The largest exhibition was *The Works of Charles and Ray Eames* at 6,500 sf and the smallest was *Two Views of Venice* at 1,000 sf. Exhibitions displayed 3056 objects; 210 (7%) were from Smithsonian collections. On average, these exhibitions displayed eight objects per 100 sf.

Exhibition Costs

For each exhibition, CHNDM uses a budget template with two primary sections: revenue sources and expenses. Revenue sources are listed individually by actual dollar amount. Expenses are budgeted across 27 base items ranging from curatorial costs to production and installation to promotional activities. For each item, actual expenses are categorized as "better" or "worse" figures alongside the projected figures. Administrative costs are budgeted at 20% of the whole budget. Totals include total expenses, grand total expenses (with administration), and surplus/deficit. The budget sheet includes the exhibition title, names of curators, and dates of public display.

¹⁹ As of March 2002. At the time of data collection, CHNDM was a part of the American Museums and National Programs division.

Exhibitions opening in FY99-00 cost \$1,902,374, out-of-pocket²⁰. The most expensive exhibition per square foot was *The Opulent Eye of Alexander Girard* (\$84.00 per sf). The least expensive exhibition per square foot was *El Nueveo Mundo* (\$10.01 per sf). The mean cost per square foot for the 10 exhibitions was \$45.07. Out-of-pocket costs totaled \$1,017,460 (mean of \$60.89 per sf) for CHNDM's original temporary exhibitions and \$884,914 (mean of \$34.52 per sf) for the six venue-only exhibitions. Costs for exhibition-related staff, including salary and benefits, were \$309,768 in FY99-00.²¹

Collaboration and Contracting

The OP&A questionnaire listed 36 exhibition-related services. On average, 19 of the services were contracted for each CHNDM-originated temporary exhibition, two services per exhibition were provided in-kind by an outside organization and/or individual, and one service (translation) was provided for one exhibition by Smithsonian volunteer translators.

For each venue-only exhibition, an average of 13 services were contracted and one service was provided in-kind by an outside organization and/or individual.

The following five services were contracted for all ten exhibitions: lighting, construction, assembly/preparation, installation, and shipping.

For exhibition-related services, CHNDM paid contractors \$608,380. Outside organizations and/or individuals provided in-kind support estimated at a value of \$45,000.

Exhibitions Staff

CHNDM has 89 full-time equivalent (FTE) staff, including 25.4 exhibition-related FTEs (29% of all FTEs). Total costs for exhibition-related staff were \$154,884 in FY00. There were no training expenditures for exhibition-related staff in FY00.

Staff working on exhibitions are distributed throughout the organization. Departments appear to report to either the Director or to the Deputy Director.

Reporting to the Director are:

- Office of the Assistant Director for Public Programs,
- Design and Exhibitions,
- Publications,
- Conservation, and
- Four curatorial departments.

The Design and Exhibitions staff of nine positions includes: a project coordinator, an exhibition coordinator, an exhibition manager, and a museum curator (art).

²⁰ All expenditures discussed here include only exhibition-related costs and do not include: in-house staff, overhead costs, publications, brochures, public programs, and advertising.

²¹ Extrapolated from FY00 staff costs.

Reporting to the Deputy Director are:

- Registrar,
- Facilities, and
- Photographic services.

In the Facilities department, staff include: a mason, a wood crafter, an electrical worker, six maintenance workers, and three custodians.

CHNDM reported the time spent (in FTEs) during FY00 by exhibition-related staff on each of 25 activities listed by OP&A. CHNDM exhibitions staff worked in 14 areas: conservation, crating, curator/researcher, exhibition design, graphic design, graphic production, installation, maintenance, management, marketing/public affairs, photography, project management, registrar/collections, and writing.

Exhibition Design and Production Capability

Over the past three years, CHNDM performed 50% of its exhibition design work in-house and 100% of that work was rendered on computers. In addition, 100% of graphic design work was completed in-house and on computers. It used architects, but not detailers, to prepare production drawings. It did not provide design or graphic production services to other Smithsonian units during the past three years.

Design and graphic design software used by CHNDM includes: MiniCAD, VectorWorks, Quark, and QuarkXpress. Unusual in-house design equipment consists of an Epson Stylus 300 color printer. Graphic production is aided by an in-house lamination/encapsulation capability. For design, CHNDM would like to have staff and funding for Web-site support, and an architect/exhibition designer. In the area of graphic production, CHNDM would like to have a large color copier/printer and graphics software.

CHNDM has a basic production capability, but has not provided any production services to other Smithsonian units during the past three years. General production, fine cabinetry, and Plexiglas capabilities at CHNDM are used 50% of the year. Other capabilities include: electrical work (5% in use), mount-making (5% in use), painting (20% in use), and wall construction (20% in use). CHNDM would like to have an adequate wood and metal shop, a new ventilation system in the wood shop, metal working equipment, and a spray booth. It would also like to have use of the National Museum of the American Indian's (NMAI) wood shop.

CHNDM does not have an in-house audiovisual or multimedia capability.

Principal Strengths and Weaknesses

CHNDM reports that its three greatest strengths related to creating and presenting exhibitions are:

- Curatorial content,
- Innovative graphics and exhibition design, and
- Ability to communicate with the broad general public.

CHNDM reports that its three greatest weaknesses related to creating and presenting exhibitions are:

- Lack of in-house architectural expertise,
- Insufficient space which impacts negatively on the ability of installation crews to function effectively and exhibitions to realize their full potential, and
- Inadequate Web presence.

The Freer Gallery of Art and the Arthur M. Sackler Gallery

Background

The Freer Gallery of Art opened in 1923. The American and Asian collections of Charles Lang Freer (1854-1919) fill an Italian Renaissance-style building, whose construction was funded by Freer as was an endowment to provide for study and acquisition.

The Arthur M. Sackler Gallery, which adjoins the Freer Gallery, opened in 1987 after Sackler donated his collection of Asian art and funds for a museum building. The Freer and Sackler Galleries (FSG) are part of the Smithsonian's International Art Museums division.

Facility

FSG has 256,000 square feet (sf) in total assignable organization space; 250,000 sf is located at the Galleries and 6,000 sf is off-site storage in Columbia, Maryland. The Galleries' public-use areas total 74,527 sf. Space dedicated exclusively to exhibitions totals 39,109 sf and mixed-use space (for exhibitions as well as other public uses) totals 10,408 sf. A possible 23,711 sf is available for temporary exhibitions. FSG does not anticipate any increase or decrease in public-use space in the near future.

FSG has 12,943 sf of non-public space designated for exhibition support. Most of that area is occupied by conservation (4,345 sf) and exhibition fabrication (3,320 sf). Other in-house functions with designated space are: design/detailing (1,550 sf), photography (1,200 sf), exhibition assembly/preparation (1,000 sf), graphics/art production (728 sf), object packing (400 sf), and storage (400 sf). FSG does not anticipate any increase or decrease in support space in the near future.

Exhibition Activity

During Fiscal Years (FYs) 1999 and 2000, FSG opened 33 exhibitions. FSG organized 30 exhibitions, two of which traveled to an average of three other venues. The temporary exhibition *The Tea Ceremony in Japan* was rotated twice after its initial installation. One exhibition was organized elsewhere, with FSG serving as a venue.

Size and Content of Exhibitions

FY99-00 exhibitions occupied 58,269 sf of space at FSG. Exhibitions averaged 1,767 sf. The largest exhibition was *Music in the Age of Confucius* (7,298, sf) and the smallest was *The Tea Ceremony in Japan* (150 sf). Exhibitions displayed 1,237 objects; 736 (60%) were from Smithsonian collections. On average, exhibitions displayed two objects per 100 sf.

Exhibition Costs

Exhibitions opening in FY99-00 cost \$1,469,870 out-of-pocket²². The most expensive exhibition per square foot was *Music in the Age of Confucius* (\$104.84 per sf). The least expensive exhibition per square foot was *Arts of the Islamic World* (\$1.07 per sf). The mean cost per square foot for the 33 exhibitions was \$15.27. Out-of-pocket costs totaled \$1,346,066 (mean of

²² All expenditures discussed here include only exhibitions-related costs and do not include: in-house staff, overhead costs, publications, brochures, public programs, and advertising.

\$14.32 per sf) for FSG's original temporary exhibitions, including those that traveled, and \$116,104 (\$23.22 per sf) for the venue-only exhibition. Object rotation costs totaled \$7,700 (mean of \$25.67 per sf). Costs for exhibition-related staff, including salary and benefits, for FY99-00 were \$5,104,830.²³

Collaboration and Contracting

The OP&A questionnaire listed 36 exhibition-related services. On average, three services were contracted for each FSG-originated temporary exhibition, less than one service was provided in-kind by an outside organization and/or individual, and less than one service was provided by another Smithsonian unit.

For the venue-only exhibition, seven services were contracted.

For each object rotation, one service was contracted.

For those exhibition-related services²⁴, FSG paid contractors \$758,586 and reimbursed other Smithsonian units \$1,056. Outside organizations and/or individuals provided in-kind support estimated at \$1,000.

Exhibitions Staff

FSG has 155 full-time equivalent (FTE) staff, including 41.25 exhibition-related FTEs (27% of all FTEs). Total costs for these exhibition-related staff were \$2,552,415 in FY00. Training expenditures for exhibition-related staff in FY00 totaled \$8,157.

Staff working on exhibitions are distributed throughout the organization. The organization has four divisions reporting to the Director:

- Membership and Development,
- Deputy Director and Chief Curator, including:
 - a. Curatorial staff,
 - b. Collection management,
 - c. Publications,
 - d. Exhibition coordinator,
 - e. Education,
 - f. Library,
 - g. Conservation, and
 - h. Rights and reproductions.
- Associate Director, including:
 - a. Photography,
 - b. Public affairs,
 - c. Information systems,
 - d. Design and production, and
 - e. Facilities.

²³ Extrapolated from FY00 staff costs.

²⁴ Services included research, design, and production services.

- Finance, including:
 - a. Shops,
 - b. Reception, and
 - c. Personnel.

FSG reported the time spent (in FTEs) during FY00 by exhibition-related staff on each of 25 activities listed by OP&A. FSG exhibitions staff work in 26 areas: administration, audiovisual (AV) production, conservation, curator/researcher, exhibition design, development, education, fabrication, finance, graphic design, graphic production, human resources, installation, interactives, lighting, lighting installation, maintenance, management, marketing/public affairs, multimedia, photography, project management, registrar/collections, shops, special events, and writing.

Exhibition Design and Production Capability

Over the past three years, FSG performed 98% of its exhibition design work in-house and 100% of that work was rendered on computers. In addition, 98% of graphic design work was completed in-house and on computers. It did not use detailers to prepare production drawings. It did not provide design and graphic production services to other Smithsonian units during the past three years.

Exhibition design and graphic design software used by FSG includes: AutoCAD, Freehand, and QuarkXpress. Unusual capabilities include: Web-site design, sculpture foundation design, AV installation design, design and technical support for unique artists' creations, rigging apparatus design, staff office design, and environment-friendly graphic production design. Graphic production is aided by an in-house Epson 5000 color printer. For design, FSG would like to have more staff from time to time. In the area of graphic production, FSG would like to have a Lambda duratrans color printer, a large format laminator, large film output, vinyl letter output, and an adhesive backing machine. It would also like to have use of the Hirshhorn Museum's (HMSG) vinyl letter output and the National Museum of African Art's (NMAfA) large format printer.

FSG has a limited production capability and did not provide production services to other Smithsonian units during the past three years. Plexiglas capabilities at FSG are used 100% of the year. Other capabilities include: painting (70% in use), matting/framing (35%), mount-making (30% in use), general production (20% in use), and fine cabinetry (10% in use).

FSG produced 100% of its computer interactives in-house over the last three years. In-house AV and multimedia equipment and capabilities include: digital sound editing (5% in use), digital film/video on location (5% in use), digital animation (5% in use), digital editing of film/video (5% in use), and digital development and programming of computer interactives (5% in use). FSG would like to have a three remote cameras, on-line video feed for the Meyer Auditorium, stage lighting, a digital encoder, a video control board, and an audio board.

Principal Strengths and Weaknesses

FSG reports that its three greatest strengths related to creating and presenting exhibitions are:

- Great collections and substantial knowledge about objects in other collections, as well as art historical expertise,
- A small, but talented and energetic, staff that is committed to the mission of the Freer and Sackler Galleries, and
- Its ability to work as a team.

FSG reports that its three greatest weaknesses related to creating and presenting exhibitions are:

- The lack of sufficient funds to develop and present exhibitions which, because of the subject matter and the areas of the world represented, often make fundraising exceedingly difficult,
- A shortage of staff (throughout the exhibition development/presentation process) relative to its active exhibition schedule, and
- Poor communication and engagement with a general audience – young people and those with no knowledge or initial interest in Asian art (though it communicates well with adult and well-educated audiences).

Hirshhorn Museum and Sculpture Garden

Background

The Hirshhorn Museum and Sculpture Garden (HMSG) opened in 1974. The bequest of Joseph H. Hirshhorn (1899-1981) comprises the core of this collection of modern and contemporary art. The Hirshhorn is part of the Smithsonian's International Art Museums division.

Facility

HMSG has 372,182 square feet (sf) in total assignable organization space; 159,172 sf is located indoors and 213,010 sf is outdoors (sculpture garden). Indoor space is occupied at the main location (159,172 sf) and at three storage facilities (Museum Support Center, Smithsonian Institution Service Center, and Columbia Gateway) (11,850 sf). The public-use area at the main location totals 63,518 sf. Space dedicated exclusively to exhibitions totals 53,910 sf and mixed-use space (for exhibitions as well as other public uses) totals 5,195 sf. A possible 18,500 sf is available for temporary exhibitions. HMSG does not anticipate any change in the amount of public-use space in the near future.

HMSG has 6,372 sf of non-public space designated for exhibition support. Most of that area is occupied by conservation (1,728 sf) and photography (1,200 sf). Other in-house functions with designated space are: storage (1,044 sf), exhibition fabrication (1,024 sf), design/detailing (512 sf), paint shop (512 sf), and graphics/art production (352 sf). HMSG does not anticipate any change in the amount of support space in the near future.

Exhibition Activity

During Fiscal Years (FYs) 1999 and 2000, HMSG opened 18 exhibitions. HMSG organized nine exhibitions, one of which traveled to two other venues. The Hirshhorn also co-organized two exhibitions: one with Olga Hirshhorn and one with the Museum of Modern Art, Oxford (which traveled to five other venues). Three permanent exhibition galleries were reinstalled during this period. Four exhibitions were organized elsewhere, with HMSG serving as a venue.

Exhibitions are scheduled on a master Gantt chart by date, floor, and curators initials. Traveling exhibitions also appear on this schedule with the names and dates of each venue.

Size and Content of Exhibitions

FY99-00 exhibitions occupied 135,399 sf of space at HMSG. Exhibitions averaged 7,522 sf. Not including reinstallations, the largest exhibitions were *Chuck Close* and *Regarding Beauty*, each at 16,900 sf and the smallest was *The Collection in Context: Horace Pippin's Holy Mountain III* at 804 sf. Exhibitions displayed 1315 objects; 467 (36%) were from Smithsonian collections. On average, exhibitions displayed one object per 100 sf.

Exhibition Costs

HMSG provided a typical exhibition budget. Each expense and each incoming amount (i.e., gift) is listed individually by accounting codes and descriptions. The 'Unit Project' (UPRJ) code for all line items related to an exhibition contains an abbreviation of the exhibition; for example, all items related to *Clyfford Still* had a UPRJ code of "56Still." For each line item, there is also a

budgeted amount, an actual amount, and the variance between the two. Totals are produced by 'Designated Code' (DSGC) and overall.

Exhibitions opening in FY99-00 cost \$2,571,294 out-of-pocket.²⁵ The most expensive exhibition per square foot was *Salvador Dali* (\$53.00 per sf). The least expensive exhibitions per square foot were *Art of Illusion* and *Contemporary Figures from the Collection* (\$0.44 per sf each). The mean cost per square foot for the 18 exhibitions was \$13.85. Out-of-pocket costs totaled \$827,853 (mean of \$9.99 per sf) for HMSG's original and collaborative temporary exhibitions and \$741,917 (mean of \$23.68 per sf) for the four venue-only exhibitions. Reinstallation costs totaled \$947,524 (mean of \$14.87 per sf). Costs for exhibition-related staff, including salary and benefits, were \$1,345,160 in FY99-00.²⁶

Collaboration and Contracting

The OP&A questionnaire listed 36 exhibition-related services. On average, five services were contracted for each HMSG-originated temporary exhibition, five services were provided in-kind by an outside organization and/or individual, and one service was provided by another Smithsonian unit.

For each venue-only exhibition, an average of 16 services were contracted, seven services were provided in-kind by an outside organization and/or individual, and less than one service was provided by another Smithsonian unit.

For those exhibition-related services²⁷, HMSG paid contractors \$2,133,969 and reimbursed other Smithsonian units \$81,729. Other Smithsonian units also provided in-kind support estimated at a value of \$750. Outside organizations and/or individuals provided in-kind support estimated at \$80,590.

Exhibitions Staff

HMSG has 74 full-time equivalent (FTE) staff, including 19.5 exhibition-related FTEs (26% of all FTEs). Total costs for these exhibition-related staff were \$672,580 in FY00. Training expenditures for exhibition-related staff totaled \$325 in FY00.

Staff working on exhibitions are distributed throughout the organization. The organization has a flat structure, with major departments reporting to the Director.

Departments with exhibition-related staff are:

- Curatorial,
- Conservation, and
- Exhibits.

HMSG reported the time spent (in FTEs) during FY00 by exhibition-related staff on each of 25 activities listed by OP&A. HMSG exhibitions staff work in 15 areas: conservation, crating,

²⁵ All expenditures discussed here include only exhibition-related costs and do not include: in-house staff, overhead costs, publications, brochures, public programs, and advertising.

²⁶ Extrapolated from FY00 staff costs.

²⁷ Services included research, design, and production services.

curator/researcher, exhibition design, detailing, fabrication, graphic design, graphic production, installation, lighting installation, management, marketing/public affairs, photography, registrar/collections, and writing.

Exhibition Design and Production Capability

Over the past three years, HMSG performed 100% of its exhibition design work in-house and 90% of that work was rendered on computers. In addition, 100% of graphic design work was completed in-house and on computers. It did not use detailers to prepare production drawings. It provided design and graphic production services to other Smithsonian units during the past three years.

Exhibition design and graphic design software used by HMSG includes: Adobe Photoshop, Adobe Illustrator, MiniCAD, and QuarkXpress. Unusual in-house design equipment includes: a Tektronix Phaser 560 color laser printer, a Xerox 8825 large format laser printer, and an Olympic digital camera. Unusual capabilities include: Web-site design, sculpture foundation design, AV installation design, design and technical support for unique artists' creations, rigging apparatus design, staff office design, and environment-friendly graphic production design. Graphic production is aided by an in-house lamination/encapsulation capability (in use 40% of the year), a 30-inch seal press, vinyl letter output capability (40% in use), and a Roland 24-inch Camm I vinyl cutter plotter. For design, HMSG would like to have a large format 600 dpi color laser printer, a digital video camera, DVD authoring and duplication equipment, a color calibration system, and larger monitors. In the area of graphic production, HMSG would like to have a high end digital camera and a digital prepress proofing system with software, calibrator, and printer. It would also like to have use of the OEC's 60-inch laminating press, the computer engraving equipment at Horticulture's Print Shop, and the Braille production equipment at the Accessibility Program and the National Air and Space Museum (NASM).

HMSG has a basic production capability and has provided production services to other Smithsonian units during the past three years. General production and fine cabinetry capabilities at HMSG are used 50% of the year. Other capabilities include: electrical work (10% in use), matting/framing (5%), painting (90% in use), wall construction (10% in use), rigging (5% in use), outdoor art installation (15% in use), custom mechanical and electrical installation, and custom AV installation. HMSG would like to have improved metal working capabilities. It would also like to have use of the NASM's crane, forklift, and manlift, and metal working equipment available at the Smithsonian.

HMSG does not have an in-house audiovisual (AV) or multimedia production capability, but it does have some equipment: a DVD player, a LCD projector, and two Barco video projectors. HMSG also has these capabilities: project management of AV installations and installation and design of AV spaces and multimedia artworks. HMSG would like to have a digital video camera and editing software.

Principal Strengths and Weaknesses

HMSG reports that its three greatest strengths related to creating and presenting exhibitions are:

- Creativity in exhibition development,
- Flexibility of exhibition staff with respect to cross-training, and
- Communication between artists and other institutions with HMSG as a whole.

HMSG reports that its three greatest weaknesses related to creating and presenting exhibitions are:

- Exhibition lighting design,
- The absence of a significant exhibition endowment, and
- Lack of staff in the exhibits and curatorial departments.

Horticulture Services Division

Background

The Horticulture Services Division (HSD) of the Office of Physical Plant (OPP) was established in 1972 to manage the grounds of the Smithsonian museums and to develop specific interior and exterior spaces as horticulture exhibitions. In addition, a research and educational program promotes the ongoing development of collections of living plants, horticultural artifacts, and garden documentation. The HSD is divided into four branches: Grounds Management Branch, Greenhouse Nursery Branch, Collection Management and Education Branch, and Integrated Pest Management. As part of OPP, HSD reports to the Secretary of the Smithsonian.²⁸

Facility

Horticulture has 80 acres in total assignable organization space. The main location, areas located on or adjacent to the National Mall, has 25 acres. The rest of the acreage is located at off-site facilities: the Museum Support Center (MSC) with 40 acres, the Cultural Resources Center (CRC) with seven acres, the U.S. Soldiers' and Airmen's Home (USSAH) with seven acres, and the Patent Office Building and the Renwick Gallery with one acre. The public-use area at the main location totals 25 acres and the public-use area at the Patent Office Building and the Renwick totals one acre. Space dedicated exclusively to exhibitions totals six acres and mixed-use space (for exhibitions as well as other public uses) totals 10 acres. A possible 9,700 sf (8,500 sf at the Quad Concourse and 1,200 sf at the A&I Rotunda) is available for temporary exhibitions. HSD anticipates an increase of 3,800 sf for exhibition display in the near future.

HSD has 52,755 sf of non-public exhibition support space that is occupied by the following: growing plants (30,760 sf), plant and prop storage (19,000 sf), gardening equipment and tools (2,000 sf), exhibition fabrication (720 sf), and design and detailing (275 sf). HSD anticipates an increase of 1,400 sf for exhibition support in the near future.

Exhibition Activity

During Fiscal Years (FYs) 1999 and 2000, Horticulture organized and opened seven exhibitions: four traveling exhibitions, two new permanent exhibitions, and one temporary exhibition.

Size and Content of Exhibitions

FY99-00 exhibitions occupied 36,336 sf of space at Horticulture and averaged 5,190 sf. The largest exhibition was the *Butterfly Habitat Garden* at 20,476 sf. The smallest was *Estate Gardens of the Early 20th Century* at 150 sf. Exhibitions displayed 9,651 objects; 4,918 (51%) were from Smithsonian collections. On average, exhibitions displayed three objects per ten sf.

²⁸ As of March 2002. At the time of data collection, OPP reported to the Undersecretary for Finance and Administration.

Exhibition Costs

Exhibitions opening in FY99-00 cost \$494,114 out-of-pocket.²⁹ The most expensive exhibition per square foot was *Estate Gardens of the Early 20th Century* (\$55.07 per sf). The least expensive exhibition per square foot was *The Pointsettia* (\$1.00 per sf). The mean cost per square foot for the seven exhibitions was \$22.61. Out-of-pocket costs for HSD's one temporary exhibition, *The Artistry of Orchids*, totaled \$41,064 (\$6.36 per sf). For the four traveling exhibitions originating at SI, out-of-pocket expenses totaled \$55,050 (mean of \$26.91 per sf). Two new permanent exhibitions cost a total of \$398,000 (mean of \$22.13 per sf). Costs for exhibition-related staff, including salary and benefits, were \$3,297,600 in FY99-00.³⁰

Collaboration and Contracting

The OP&A questionnaire listed 36 exhibition-related services. For the one temporary exhibition, one service was contracted, eight services were provided in-kind by an outside organization and/or individual, and eight services were provided by another Smithsonian unit.

For the four traveling exhibitions, an average of two services were contracted, less than one service was provided in-kind by an outside organization and/or individual, and ten services were provided by another SI unit.

For the two permanent exhibitions, an average of three services were contracted, four services were provided in-kind by an outside organization, and eight services were provided by another Smithsonian unit.

For these exhibition-related services³¹, HSD paid contractors \$395,259 and reimbursed Smithsonian units \$40,700. Other Smithsonian units also provided in-kind support estimated at a value of \$100,560. Outside organizations and/or individuals provided in-kind support estimated at \$98,000.

Exhibitions Staff

HSD has 50 full-time equivalent (FTE) staff, including 41.5 exhibition-related FTEs (83% of all FTEs). Total costs for these exhibition-related staff were \$1,648,800 in FY00. Training expenditures for exhibition-related staff totaled \$53,300 in FY00.

Staff working on exhibitions is distributed throughout the organization. There are five division chiefs who report to the director of HSD. HSD reported the time spent (in FTEs) during FY00 by exhibitions-related staff on each of 25 activities listed by OP&A. Horticulture exhibitions staff work in five areas: management/administration, registration/collection, engineering/architecture, installation, and exhibitions maintenance.

Exhibition Design and Production Capability

Over the past three years, HSD performed 85% of its exhibition design work in-house and 50% of that work was rendered on computers. In addition, 10% of its graphic design work was

²⁹ All expenditures discussed here include only exhibition-related costs and do not include: in-house staff, overhead costs, publications, brochures, public programs, and advertising.

³⁰ Extrapolated from FY00 staff costs.

³¹ Services included research, design, and production services.

completed in-house and 100% of that graphic design work was completed on computers. HSD contracted with detailers to prepare production drawings. It provided design, but not graphic production, services to other Smithsonian units during the past three years.

Exhibition design and graphic design software used by HSD includes: AutoCad and LandCad. Unusual in-house design equipment includes an 11" x 17" Laser Jet printer. For design, HSD would like to have a large paper plotter, a computer, a color laser jet printer, and a large format copier. It would also like to have use of OPP/Engineering and Design Division's HP large plotter, large format printer, and large format copier, and the cabinetry, silkscreen, fiberglass models, and welding materials available at the OEC.

Horticulture has no graphic production capabilities and has not provided production services to other Smithsonian units during the past three years. HSD would like to have use of OEC's silkscreening equipment and have access to photographic enlargements through the OIPP.

HSD has certain exhibition fabrication capabilities, including general structure production, metalworking, and stoneworking, all in use 100% of the year. Its unusual fabrication capabilities include building stonewalls, welding frames for topiaries, making fiberglass liners for urns, and growing any size or shape plant. In the last three years, it has provided equipment to other SI units for their use. HSD would like to use NASM's welding system, OEC's fiberglass and minor cabinetry, and OPP's plumbing and drywall.

Horticulture does not have an in-house audiovisual or multimedia production capability.

Principal Strengths and Weaknesses

HSD reports that its three greatest strengths related to creating and presenting exhibitions are:

- In-house installations,
- Maintenance of exhibitions, and
- Design of creative exhibitions.

HSD reports that its three greatest weaknesses related to creating and presenting exhibitions are:

- Project management,
- Administrative help, and
- Lack of scriptwriters.

International Gallery at the S. Dillon Ripley Center

Background

The International Gallery (IG) presents exhibitions that deal with significant topics from various disciplines and cultural perspectives. The gallery offers educational programming in conjunction with most exhibits. The Gallery operates as a department of the Smithsonian Institution Traveling Exhibition Service (SITES) and, thus, is a part of the Smithsonian's American Museums and National Programs division.

Facility

IG has 24,255 square feet (sf) in total assignable organization space. The public-use area totals 23,438 sf and includes not only the main Gallery, but also other areas of the Ripley Center, such as the lobby, escalator well, concourse, and auditorium. Space dedicated exclusively to exhibitions totals 6,430 sf, located in the core gallery. Mixed-use space (for exhibitions as well as other public uses) is 13,141 sf.³² A possible 9,286 sf is available for temporary exhibitions.³³ IG does not anticipate any change in the amount of public-use space in the near future.

The IG has no non-public exhibition support space separate from the 817 sf of offices housed in the Ripley Center.

Exhibition Activity

IG primarily serves as a venue for exhibitions created elsewhere at the Smithsonian Institution or by outside museums or exhibit houses. During Fiscal Years (FYs) 1999 and 2000, IG opened three exhibitions. *Microbes: Invisible Invaders*, *Amazing Allies* was produced by BBH Exhibits, Inc. IG was a co-organizer of *PIANO 300: Celebrating Three Centuries of People and Pianos* with the National Museum of American History and of *The Jewels of Lalique* with Exhibitions International Inc. and Cooper-Hewitt, National Design Museum.

Size and Content of Exhibitions

FY99-00 exhibitions occupied 28,686 sf of space at IG and averaged 9,562 sf. All three exhibitions were roughly the same size: *Microbes* at 10,000 sf, *PIANO 300* at 9,400sf, and *Jewels* at 9,286 sf. Exhibitions displayed 368 objects; 70 (19%) were from Smithsonian collections. On average, exhibitions displayed one object per 100 sf.

Exhibition Costs

Exhibitions opening in FY99-00 cost \$352,704 out-of-pocket.³⁴ The most expensive exhibition per square foot was *Microbes* (\$16.70 per sf). The least expensive exhibition per square foot was *The Jewels of Lalique* (\$3.58 per sf). The mean cost per square foot for the three exhibitions was

³² This area includes the Ripley Center lobby, Ripley Center concourse, and the gallery spaces.

³³ This area includes all gallery spaces and access halls.

³⁴ All expenditures discussed here include only exhibition-related costs and do not include: in-house staff, overhead costs, publications, brochures, public programs, and advertising. Additionally, this figure does not include the \$150,000 rental fee for *Microbes*, which was paid by the exhibition's sponsor, Pfizer.

\$12.19. Costs for exhibition-related staff, including salary and benefits, were \$342,804 in FY99-00.³⁵

Collaboration and Contracting

The OP&A questionnaire listed 36 exhibition-related services. On average, 20 of services listed were contracted for these three exhibitions, one service was provided in-kind by an outside organization and/or individual, and 17 services were provided by another Smithsonian unit.

For those exhibition-related services³⁶, IG paid contractors \$102,680 and reimbursed Smithsonian units \$109,057.

Exhibitions Staff

IG has two staff (FTE), including 1.75 exhibition-related FTEs (88% of all FTEs). No exhibitions originate from IG. Total costs for these exhibition-related staff were \$171,402 in FY00. IG is a department of SITES and the director of IG reports to the director of SITES.

IG reported the time spent (in FTEs) during FY00 by exhibitions-related staff on each of 25 activities listed by OP&A. IG exhibitions staff works in two areas: management/administration and project management.

Exhibition Design and Production Capability

IG does not solely originate exhibitions and, thus, it has no exhibition design, graphic design, graphic production, fabrication, or audiovisual/multimedia capabilities.

Principal Strengths and Weaknesses

IG reports that its three greatest strengths related to creating and presenting exhibitions are:

- Flexibility to adapt to diverse scheduling requirements, budget constraints, limited support services, as well as the ability to assemble appropriate temporary exhibition staffing.
- Ability to work collaboratively with both internal and external partners, and
- Creative skills in interpreting and programming a wide variety of exhibition subjects and topics.

IG reports that its three greatest weaknesses related to creating and presenting exhibitions are:

- Lack of permanent marketing/publicity staff,
- Lack of dedicated development staff, and
- Lack of permanent exhibition maintenance staff.

³⁵ Extrapolated from FY00 staff costs.

³⁶ Services included research, design and production services.

National Museum of African Art

Background

The National Museum of African Art (NMAfA) was founded in 1964, became a part of the Smithsonian Institution in 1979, and opened its facility on the Mall in 1987. NMAfA is a part of the Smithsonian's International Art Museums division.

Facility

NMAfA has 72,000 square feet (sf) in total assignable organization space: 68,000 sf is located at the main location and 4,000 sf is off-site storage in Columbia, Maryland. The public-use area at the main location totals 41,000 sf. Space dedicated exclusively to exhibitions totals 18,900 sf and mixed-use space (for exhibitions as well as other public uses) totals 4,500 sf. A possible 9,810 sf is available for temporary exhibitions. NMAfA does not anticipate any increase or decrease in public-use space in the near future.

NMAfA has 9,860 sf of non-public space designated for exhibition support.³⁷ Most of that area is occupied by storage (5,187 sf) and exhibition assembly and preparation (2,993 sf). Other in-house functions with designated space are: graphics/art production (1,731 sf), exhibition fabrication (1,679 sf), crate construction (1,679 sf), design/detailing (1,462 sf), conservation (1,335 sf), object packing (1,187 sf), photography (667 sf), exhibition maintenance (600 sf), and mount-making (270 sf). NMAfA does not anticipate any change in the amount of support space in the near future.

Exhibition Activity

During Fiscal Years (FYs) 1999 and 2000, NMAfA opened 15 exhibitions. One permanent exhibition space, the Pavilion, was upgraded during this period. Three exhibitions were organized elsewhere, with NMAfA serving as a venue.

Size and Content of Exhibitions

FY99-00 exhibitions occupied 35,890 sf of space at NMAfA. Exhibitions averaged 2,393 sf. The largest exhibitions were *Baule* (5,450 sf) and *Kente* (5,400 sf) and the smallest was *Ceramics* at 525 sf. Exhibitions displayed 933 objects; 340 (36%) were from Smithsonian collections. On average, exhibitions displayed three objects per 100 sf.

Exhibition Costs

NMAfA provided a standard exhibition budget worksheet. Listed under four major categories (design, graphics, installation, and cabinet shop) are the estimated costs, amounts spent, and balances for various services provided and materials used by in-house capacities. Listed separately, on the same sheet, are contractor costs, OPP costs, and contingency funds of 10%. Totals are broken down by category.

³⁷ The total sum of spaces is greater than 9,860 sf because some spaces have multiple uses.

Exhibitions opening in FY99-00 cost \$511,550 out-of-pocket³⁸. The most expensive exhibition per square foot was *Ceramics* (\$38.10 per sf). The least expensive exhibition per square foot was *Musical Instruments* (\$0.45 per sf). The mean cost per square foot for the six exhibitions was \$11.29. Out-of-pocket costs totaled \$144,895 (mean of \$8.65 per sf) for NMAfA's original temporary exhibitions and \$355,534 (mean of \$23.66 per sf) for the three venue-only exhibitions. The Pavilion upgrade costs totaled \$11,121 (\$3.18 per sf). Costs for exhibition-related staff, including salary and benefits, were \$1,823,417 in FY99-00.³⁹

Collaboration and Contracting

The OP&A questionnaire listed 36 exhibition-related services. On average, one of listed services was contracted for each NMAfA-originated temporary exhibition and less than one service was provided by another Smithsonian unit.

For each venue-only exhibition, an average of three services were contracted and less than one service was provided by another Smithsonian unit.

For those exhibition-related services⁴⁰, NMAfA paid contractors \$392,934 and reimbursed Smithsonian units \$4,100. Other Smithsonian units also provided in-kind support estimated at a value of \$500. Outside organizations and/or individuals provided in-kind support estimated at \$21,000.

Exhibitions Staff

NMAfA has 57 full-time equivalent (FTE) staff, including 14 exhibition-related FTEs (25% of all FTEs). Total costs for these exhibition-related staff were \$911,708 in FY00. Training expenditures for exhibition-related staff in FY00 totaled \$6,000.

Staff working on exhibitions are distributed throughout the organization. The organization has three primary branches reporting to the Director: (1) Exhibitions and Facility; (2) Collections, Research and Interpretation; and (3) Administration.

Exhibitions and Facility includes (but is not limited to):

- Design,
- Graphic design,
- Exhibition production, and
- Web site and multimedia.

Collections, Research and Interpretation includes (but is not limited to):

- Curatorial,
- Conservation, and
- Photographic archives.

³⁸ All expenditures discussed here include only exhibition-related costs and do not include: in-house staff, overhead costs, publications, brochures, public programs, and advertising.

³⁹ Extrapolated from FY00 staff costs.

⁴⁰ Services included research, design, and production services.

NMAfA reported the time spent (in FTEs) during FY00 by exhibitions-related staff on each of 25 activities listed by OP&A. NMAfA exhibitions staff worked in 20 areas: audiovisual production, conservation, curator/researcher, exhibition design, detailing, driving, fabrication, facilities management, graphic design, graphic production, installation, lighting installation, management, marketing/public affairs, mount-making, multimedia, photography, project management, registrar/collections, and writing.

Exhibition Design and Production Capability

Over the past three years, NMAfA performed 90% of its exhibition design work in-house and 100% of that work was rendered on computers. In addition, 90% of its graphic design work was completed in-house with 100% done on computers. It did not use contracted detailers to prepare production drawings. NMAfA provided design, but not graphic production, services to other Smithsonian units during the past three years.

Exhibition design and graphic design software used by NMAfA includes: Adobe Photoshop, Adobe Illustrator, AutoCAD, Director, Flash, Quark, and QuarkXpress. Unusual in-house design equipment includes: a Xerox 2115 copier and an Epson 3000 color printer. Graphic production is aided by an in-house plotter with large format output (in use 100% of the year). For design, NMAfA would like to have a color copier and a high resolution scanner. In the area of graphic production, NMAfA would like to have a large screen production high resolution photo printer and vinyl cut lettering capability. It would also like to have use of the photo production and printing equipment at the OIPP.

NMAfA has a well-rounded production capability and has provided production services to other Smithsonian units during the past three years. General production, fine cabinetry, mount-making, and painting capabilities at NMAfA are used 100% of the year. Other capabilities include: metal working (50% in use), model-building (15% in use), unusual finishes (25% in use), and wall construction (25% in use). Equipment includes a long bed stroke sander and a panel saw. NMAfA would like to have improved metal working equipment and Plexiglas fabrication capabilities. It would also like to utilize OEC's Plexiglas fabrication equipment.

Most (75%) of NMAfA's audiovisual and multimedia production is completed in-house. NMAfA has the following capabilities: analog recording on location (25% in use), analog sound editing (20% in use), digital filming/video on location (0% in use), analog animation (25% in use), analog engineering/construction of custom electrical output devices (20% in use), and development and programming of digital interactives (50% in use). NMAfA also has the following equipment: a Roland 100 audio recorder, programmable recorders, and Museum Technologies VDC 212 video laser disc controllers. NMAfA would like to have DVD players and controllers, flat touch screen monitors, flat screen (view only) monitors, and a BetaCam SP recorder/player.

Principal Strengths and Weaknesses

NMAfA reports that its three greatest strengths related to creating and presenting exhibitions are:

- Scholarship and education,
- Design and fabrication, and
- High quality, low cost products.

NMAfA reports that its three greatest weaknesses related to comes to creating and presenting exhibitions are:

- Insufficient funds for exhibition projects and qualified staff,
- Poor contextual development, time management, and performance on exhibition projects involving curatorial and editorial staff, and
- Space limitations for exhibit fabrication and storage.

National Air and Space Museum

Background

The National Air and Space Museum (NASM), caring for collections since 1889, opened in its present building on the National Mall in 1976. The Paul E. Garber Preservation, Restoration, and Storage Facility, NASM's primary storage facility, is located in Suitland, Maryland and opened to the public in 1977. The Steven F. Udvar-Hazy Center is scheduled to open in December 2003, in Dulles, Virginia. NASM is a part of the Smithsonian's AMNP division.

Facility

NASM has 652,898 square feet (sf) in total assignable organization space; 446,398 sf is located at the main location and 206,500 sf is off-site at the Garber facility. The public-use area at the main location totals 204,842 sf. Space dedicated exclusively to exhibitions totals 155,040 sf and mixed-use space (for exhibitions as well as other public uses) totals 10,000 sf. A possible 11,630 sf is available for temporary exhibitions. NASM anticipates an increase of 24,927 sf in public-use space in the near future.

NASM has 28,375 sf of non-public space designated for exhibition support. Most of that area is occupied by exhibition maintenance (7,232 sf) and exhibition fabrication (7,000 sf). Other in-house functions with designated space are: storage (4,000 sf), graphics/art production (3,500 sf), design/detailing (2,625 sf), audiovisual (AV) electronics (2,098 sf), photography (840 sf), conservation (450 sf), AV/multimedia production (240 sf), film production (240 sf), and model-making (150 sf). NASM does not anticipate any increase or decrease in support space in the near future.

Exhibition Activity

During Fiscal Years (FYs) 1999 and 2000, NASM did not open any exhibitions. In January 1998, the skylight and window replacement project and the upgrade and /or replacement of 16 major infrastructure systems started at NASM. A decision was made by museum management that the museum would not install any new exhibition galleries or major upgrades during this window wall replacement period.

During this period, the Exhibits Division engaged in an aggressive exhibits maintenance program and continued the design and installation of a new way-finding and signage program in the museum. Design and development has proceeded for several major exhibitions in order to begin the replacement and/or upgrade of the permanent exhibitions over a period of years. In addition, the museum actively participated in the design of the new Steven Udvar-Hazy Center and the layout of artifacts. It continues to develop exhibits for its opening.⁴¹

The last permanent exhibitions to open at NASM were *How Things Fly* in 1996 (5,385 sf) and *Space Race* in 1997 (11,730 sf). The most recent upgrades or renovations occurred in *World War I* (752 sf) and *Pioneers of Flight* (2,000 sf), both in 1997.

⁴¹ Adapted from the NASM's response to the question, "Is the level of exhibition activity between October 1998 and September 2000 typical of your organization? If it is not, please explain."

The Exhibits Process consists of eight stages:

- The proposal,
- The impact statement,
- The planning document,
- The label script,
- The design phase,
- The production phase,
- The director's walk-through, and
- Exhibit maintenance.

Exhibitions are scheduled on spreadsheets by the fiscal year in which they open. The schedule identifies each exhibition project by title, gallery, curator name, designer name, and project manager name. Projects are tracked against ten milestones including 'proposal approved,' 'submit label script,' 'approved graphic design,' and 'public open.' The NASM Exhibits Department submitted exhibits schedules for FY 2000 through FY 2003.

Exhibition Costs

NASM utilizes an Exhibition Budget Plan that can be used to calculate either of two kinds of cost estimates: conceptual cost or exhibit budget. The conceptual cost is defined as the preliminary budget estimated in consultation with the exhibit designer, curator, and project manager before script work or drawings have begun. This budget is used as the basis for the development of an impact statement. The final exhibit budget is a detailed budget that itemizes costs for all exhibits and planning documents.

The Exhibition Budget Plan is divided into two sections: exhibition costs (all costs directly related to the exhibition) and other costs (education, development, programs, publicity, and opening event). Man-hours expended by NASM staff are listed on the final page along with the signatures of the project manager, curator, designer, and Associate Director for Exhibitions & Public Services.

Exhibitions Staff

NASM has 300 full-time equivalent (FTE) staff, including 43.25 exhibition-related FTEs (14% of all FTEs). Total costs for these exhibition-related staff were \$2,512,157 in FY00.

NASM is organized with three departments (Collections & Research, Exhibits & Public Services, and Operations & Administration) reporting to the Deputy Director. Other offices, including Public Affairs and Development, report to the Director. Staff working on exhibitions are primarily located in the Exhibits Division of the Exhibits & Public Services Department, although curators who contribute to exhibitions are found in the Aeronautics and Space History Divisions of the Collections & Research Department.

The Exhibits Division has three units:

- Design,
- Audiovisual, and
- Production.

NASM reported the time spent (in FTEs) during FY00 by exhibitions-related staff on each of 25 activities listed by OP&A. NASM exhibitions staff work in 16 areas: exhibition design, fabrication, film, graphic design, graphic production, interactives, installation, lighting installation, maintenance, management, mount-making, multimedia production, project management, special events, support, and writing.

Exhibition Design and Production Capability

Over the past three years, NASM performed 80% of its exhibition design work in-house and 95% of that work was rendered on computers. In addition, 60% of its graphic design work was completed in-house and on computers. NASM contracted with detailers to prepare production drawings. It provided design and graphic production services to other Smithsonian units during the past three years.

Exhibition design and graphic design software used by NASM includes: Adobe Photoshop, Adobe Illustrator, AutoCAD, Extensis Portfolio, Mac Opener, MS Project, Type Manager, and QuarkXpress. Unusual in-house design equipment includes: a Xerox large paper copier and a HP 750 plotter. Graphic production is aided by an in-house large format output plotter (in use 95% of the year), lamination/encapsulation capability (60% in use), vinyl letter output capability (35% in use), a router system with 3D cutting ability (30% in use), and silkscreening (10% in use). For design, NASM would like to have additional scanning technology and to have exhibit developers and an evaluator on staff. In the area of graphic production, NASM would like to have a HP 5000 60-inch wide format printer. The designers would like to have use of equipment located elsewhere in NASM such as the photo shop's Fuji film pictography 4000 and Minolta Dimage Multiscan film scanner and the Registrar's Epson 836XL flatbed scanner. They would also like to use the NMAH's IMACON Flextight Precision II scanner.

NASM has a basic production capability and has provided production services to other Smithsonian units during the past three years. Electrical work and metal working capabilities at NASM are used 100% of the year. Other capabilities include: fine cabinetry (75% in use), matting/framing (35%), model-building (30% in use), general production (25% in use), wall construction (20% in use), castings (15% in use), mount-making (15% in use), mannequins (10% in use), unusual finishes (5% in use), Plexiglas work (5% in use), and electronic and mechanical systems for design and fabrication. NASM has the following equipment: a panel saw, router and computer software, routing case work components, pin router, TIG welder, 36-inch metal lathe, and vertical mill.

Over the last three years, NASM produced all of its computer interactives in-house; it has not served other SI units. On the exhibition floors, NASM has three DVD players, six digital video playback systems, two high definition digital players, and two high definition projectors. NASM has these additional capabilities: analog and digital audio recording in studio and on location, analog and digital sound editing (10% in use), analog and digital film/video in studio and on location, analog and digital film/video editing, analog and digital animation, analog and digital engineering/construction of custom electronic output devices (30% in use), digital development and programming of computer interactives (100% in use), and analog and digital pressing of laser disks.

Principal Strengths and Weaknesses

NASM reports that its three greatest strengths related to creating and presenting exhibitions are:

- Creative, talented, experienced, and resourceful exhibits staff,
- A high degree of flexibility using in-house staff that support both the design and production of exhibitions and other projects characterized as the Director's priorities, and
- Technological resources in design and production that have been developed to create exhibitions of high quality.

NASM reports that its three greatest weaknesses related to creating and presenting exhibitions are:

- The inability to set museum goals and priorities and to obtain support necessary to proceed with them,
- The inability to obtain adequate funding for training for new exhibition technologies, and
- Inadequacy in the number of staff; at times, the staff is "spread thin" due to non-exhibit related requests.

National Museum of American History

Background

The National Museum of American History (NMAH) first opened as the Museum of History and Technology in 1964; it adopted its present name in 1980. NMAH collections are based on the first collections held by the U.S. National Museum, established by the Smithsonian Institution in the 1850s. NMAH is a part of the Smithsonian's American Museums and National Programs division.

Facility

NMAH has 889,632 square feet (sf) in total assignable organization space; 699,132 sf is located at the main location and 190,500 sf is off-site at three storage facilities (Garber, Museum Support Center, and Fullerton warehouse). The public-use area at the main location totals 324,865 sf. Space dedicated exclusively to exhibitions totals 211,254 sf and mixed-use space (for exhibitions as well as other public uses) totals 15,000 sf. A possible 6,000 sf is available for temporary exhibitions. NMAH does not anticipate any change in the amount of public-use space in the near future.

NMAH has 23,385 sf of non-public space designated for exhibition support. Most of that area is occupied by exhibition fabrication (10,134 sf). Other in-house functions with designated space⁴² are: film production (5,437 sf), graphics/art production (5,090 sf), design/detailing (2,500 sf), conservation (1,745 sf), photography (1,383 sf), object packing (1,256 sf), audiovisual/multimedia (551 sf), and exhibition maintenance (289 sf). NMAH does not anticipate any increase or decrease in support space in the near future.

Exhibition Activity

During Fiscal Years (FYs) 1999 and 2000, NMAH opened 17 exhibitions. NMAH organized 16 exhibitions, of which 13 were temporary exhibitions and three were permanent exhibitions. One temporary exhibition, *PIANO 300*, was mounted at the IG. NMAH also hosted one exhibition created by the Smithsonian Asian Pacific American Program.

Exhibitions are created using a two-part process outlined in NMAH's Policies & Procedures Manual. Part I is the Approval Process – seven steps generally spanning two years' time developing proposals and packages. The exhibition script undergoes review before moving to the next step. Part II is the Implementation Process, generally spanning another two years during which design, A/E, and production contracts are awarded and managed, culminating in the opening of an exhibition.

Each exhibition has a schedule that outlines tasks with major phases of the project, along with the duration of the task, the start and end dates, and the staff responsible for the task. This schedule can be produced as an Excel spreadsheet or as a Gantt chart.

⁴² Some functions may share space.

Size and Content of Exhibitions

FY99-00 exhibitions occupied 25,547 sf of space at NMAH and averaged 1,781 sf. Not including reinstallations, the largest exhibition was *PIANO 300* at 6,000 sf and the smallest were *Rube Goldberg*, *Census 2000*, and *Panama Canal* at 14 sf each. Exhibitions displayed 1,697 objects; 1,671 (98%) were from Smithsonian collections. On average, exhibitions displayed seven objects per 100 sf.

Exhibition Costs

The Project Management Office provides budget templates requiring an administrative fee of 14% to cover development and project management costs. Budgets must also include indirect costs such as NMAH staff that will be dedicated to the project.

Exhibitions opening in FY99-00 cost \$3,629,861 out-of-pocket⁴³. The most expensive exhibition per square foot was *On Time* (\$281.25 per sf). The least expensive exhibition per square foot was *American Diary* (\$1.65 per sf). The mean cost per square foot for the 17 exhibitions was \$108.98. Out-of-pocket costs totaled \$1,746,861 (mean of \$101.35 per sf) for NMAH original temporary exhibitions and \$2,000 (\$1.65 per sf) for the one venue-only exhibition. Costs for new permanent exhibitions totaled \$2,435,500 (mean of \$177.83 per sf). Costs for exhibition-related staff, including salary and benefits, for FY99-00 were \$7,993,260.⁴⁴

Collaboration and Contracting

The OP&A questionnaire listed 36 exhibition-related services. On average, five of the listed services were contracted for each NMAH-originated temporary exhibition, two services were provided in-kind by an outside organization and/or individual, and three services were provided by another Smithsonian unit.

For each new permanent exhibition, an average of 12 services were contracted, two services were provided in-kind by an outside organization and/or individual, and six services were provided by another Smithsonian unit.

For exhibition-related services⁴⁵, NMAH paid contractors \$1,590,689 and reimbursed Smithsonian units \$205,250. Other Smithsonian units also provided in-kind support estimated at a value of \$101,000. Outside organizations and/or individuals provided in-kind support estimated at \$435,000.

Exhibitions Staff

NMAH has 327 full-time equivalent (FTE) staff, including 127.25 exhibition-related FTEs (39% of all FTEs). Total costs for these exhibition-related staff were \$3,996,630 in FY00. Training expenditures for exhibition-related staff in FY00 totaled \$5,770.

⁴³ All expenditures discussed here include only exhibition-related costs and do not include: in-house staff, overhead costs, publications, brochures, public programs, and advertising.

⁴⁴ Extrapolated from FY00 staff costs.

⁴⁵ Services included research, design, and production services.

NMAH has a flat organization structure, with major departments reporting to the Director. Staff working on exhibitions are primarily located in three units. Curatorial Affairs includes the Department of Collections Management Services and the Department of History. Public Services includes Education, Design & Public Space Planning, and Exhibits, Audiovisual (AV), & Services. Administration & Automation Services oversees the Project Management Office, which distributes the booklet "Guide to Project Management at NMAH." This guide outlines the roles and responsibilities of all participants in a project from the project manager to the director. It also provides definitions, procedures, exhibition guidelines, and checklists.

NMAH reported the time spent (in FTEs) during FY00 by exhibitions-related staff on each of 25 activities listed by OP&A. NMAH exhibitions staff worked in 29 areas: administration, archivist, AV production, conservation, curator/researcher, custodial/labor, exhibition design, detailing, education, engineering, fabrication, facilities management, film, finance, graphic design, graphic production, installation, interactives, lighting, lighting installation, maintenance, management, mount-making, multimedia production, photography, project management, registrar/collections, visitor research, and writing.

Exhibition Design and Production Capability

Over the past three years, NMAH performed 30% of its exhibition design work in-house and 75% of that work was rendered on computers. In addition, 50% of its graphic design work was completed in-house and all of it on computers. It contracted with detailers to prepare production drawings. NMAH provided design and graphic production services to other Smithsonian units during the past three years.

Exhibition design and graphic design software used by NMAH includes: Adobe Photoshop, Adobe Illustrator, AutoCAD, QuarkXpress, and Vectorworks. Unusual in-house design equipment includes: two Tektronix Phaser 780 color laser copiers, a Canon 300 color laser copier, a HP DesignJet 1055CM color printer, two HP LaserJet 5000N printers, an Argus AFGA scanner, and an Epson scanner. Graphic production is aided by an in-house large format output plotter (in use 100% of the year), lamination/encapsulation capability (100% in use), vinyl letter output capability (100% in use), four-color printing on self-adhesive vinyl, an Imagesetter (75% in use), and silkscreening (20% in use). For design, NMAH would like to have a computer support service, equipment and memory for scanning architectural documents, the latest software, more memory for 3D modeling, and staff training. In the area of graphic production, NMAH would like to have a large format printer, additional memory, computer support, self-calibrating monitors, a color management system, and staff training. It would also like to have use of the photo-quality printer at OIPP.

NMAH has a well-rounded production capability and has provided production services to other Smithsonian units during the past three years. General production, fine cabinetry, matting/framing, mount-making, painting, Plexiglas work, and historic restoration capabilities at NMAH are used 100% of the year. Other capabilities include: wall construction (75% in use), castings (15% in use, also specialized architectural casting),

metalworking (10% in use), model-building (10% in use), unusual finishes (10% in use), architectural layout, and metal casting. NMAH would like to have a CNC router. It would also like to have use of NASM's Gerber router and the Plexiglas fabrication, taxidermy, and general carpentry at OEC.

In the past three years, NMAH produced 50% of its computer interactives in-house and used its equipment to provide services to other SI units. NMAH has laser disk players, DVD players, digital engineering/construction of custom electronic output devices (20% in use), and digital development and production of computer interactives (20% in use). NMAH would like to have DigiBeta record /playback devices, DVD video compression, and a broadcast quality authoring system. NMAH would also like to have use of SI Productions' video and audio equipment.

Principal Strengths and Weaknesses

NMAH reports that its three greatest strengths related to creating and presenting exhibitions are:

- Knowledge of existing artifacts and collections,
- Integration of public programs with exhibits to create seamless learning opportunities, and
- Project management.

NMAH reports that its three greatest weaknesses related to creating and presenting exhibitions are:

- Depletion of certain support capabilities (i.e., conservation) requiring outsourcing and attendant lengthy contracting processes,
- Lack of staff to cover various major subject areas on the program/curatorial side, and
- Insufficient administrative staff within the museum to complete administrative tasks in a timely fashion.

National Museum of the American Indian

Background

The National Museum of the American Indian (NMAI), established in 1989, currently occupies two facilities: the George Gustav Heye Center in New York (1994) and the Cultural Resources Center (CRC) in Suitland, Maryland (1998). A third facility, NMAI on the National Mall, is scheduled to open in 2004. NMAI is part of the Smithsonian's AMNP division. This profile addresses the activities of the Heye Center.

Facility

NMAI has 100,000 square feet (sf) in total assignable organization space, of which 90,000 sf is located at the Heye Center.⁴⁶ The public-use area at the Heye Center totals 55,000, sf. Space dedicated exclusively to exhibitions totals 15,000 sf and mixed-use space (for exhibitions as well as other public uses) totals 40,000 sf. A possible 10,000 sf is available for temporary exhibitions. NMAI does not anticipate any increase or decrease in public-use space in the near future.

NMAI has 4,100 sf of non-public space designated for exhibition support. Most of that area is occupied by exhibition fabrication (1,200 sf). Other in-house functions with designated space are: conservation (1,000 sf), graphics/art production (900 sf), design/detailing (500 sf), storage (300 sf), exhibition assembly and preparation (100 sf), and audiovisual/multimedia (100 sf). NMAI does not anticipate any increase or decrease in support space in the near future.

Exhibition Activity

During Fiscal Years (FYs) 1999 and 2000, NMAI opened two exhibitions; both were organized elsewhere with NMAI serving as a venue.

Size and Content of Exhibitions

FY99-00 exhibitions occupied 8,000 sf of space at NMAI (4,000 sf each). Exhibitions displayed 300 objects; 18 (6%) were from Smithsonian collections. On average, exhibitions displayed four objects per 100 sf.

Exhibition Costs

Exhibitions opening in FY99-00 cost \$450,000 out-of-pocket⁴⁷. The most expensive exhibition per square foot was *Art of Being Kuna* (\$62.50 per sf). The least expensive exhibition per square foot was *Pomo Basketweavers* (\$50.00 per sf). The mean cost per square foot for the two exhibitions was \$56.25. Costs for exhibition-related staff, including salary and benefits, were \$2,722,628 in FY99-00.⁴⁸

⁴⁶ NMAI also has 10,000 sf of office space at L'Enfant Plaza in Washington, D.C.

⁴⁷ All expenditures discussed here include only exhibition-related costs and do not include: in-house staff, overhead costs, publications, brochures, public programs, and advertising.

⁴⁸ Extrapolated from FY00 staff costs.

Collaboration and Contracting

The OP&A questionnaire listed 36 exhibition-related services. On average, two of the listed services were contracted for each exhibition and five services were provided in-kind by an outside organization and/or individual.

For those exhibition-related services⁴⁹, NMAI paid contractors \$250,000. Outside organizations and/or individuals provided in-kind support estimated at \$720,000.

Exhibitions Staff

NMAI has 240 full-time equivalent (FTE) staff, including 15 exhibition-related FTEs (6% of all FTEs). Total costs for these exhibition-related staff were \$1,361,314 in FY00. Training expenditures for exhibition-related staff in FY00 totaled \$6,000.

NMAI reported the time spent (in FTEs) during FY00 by exhibitions-related staff on each of 25 activities listed by OP&A. NMAI exhibitions staff worked in six areas: exhibition design, fabrication, graphic design, management, multimedia, and project management.

Exhibition Design and Production Capability

Over the past three years, NMAI performed 100% of its exhibition design work in-house and 75% of that work was rendered on computers. In addition, 100% of its graphic design work was completed in-house and on computers. NMAI did not use detailers to prepare production drawings. It provided design, but not graphic production, services to other Smithsonian units in the past three years.

Exhibition design and graphic design software used by NMAI includes: AutoCAD, Vectorworks, and Quark. Unusual in-house design equipment includes: a large copier and two plotters. Graphic production is aided by a large format output plotter (in use 30% of the year) and vinyl letter output capability (30% in use).

NMAI has limited production capabilities and has not provided production services to other Smithsonian units over the past three years. General production and fine cabinetry capabilities at NMAI are used 80% of the year. NMAI also has a mount-making capability (15% in use).

NMAI produced 30% of its computer interactives in-house over the past three years, but has not provided any services to other Smithsonian units. Such work is aided by these capabilities: digital recording on location (10% in use), analog and digital film/video on location (20% in use), digital editing of film/video (10% in use), and development and programming of digital interactive (10% in use).

Principal Strengths and Weaknesses

NMAI reports that its three greatest strengths related to creating and presenting exhibitions are:

- Design,
- Cabinetwork, and
- Installation.

⁴⁹ Services included research, design, and production services.

NMAI reports that its two greatest weaknesses related to creating and presenting exhibitions are:

- Metalwork, and
- Plexi-work.

National Museum of Natural History

Background

The Museum of Natural History opened the doors of its present facility on the National Mall in 1911 as part of the U.S. National Museum, established in 1858. The museum changed its name to the National Museum of Natural History (NMNH) in 1969. NMNH is part of the Smithsonian's Science division.

Facility

NMNH has 1,709,015 square feet (sf) in total assignable organization space; 1,318,515 sf is located at the main location and 390,500 sf is off-site (Newington, Virginia; Columbia, Maryland; Naturalist Center; Museum Support Center; and Smithsonian Marine Station). The public-use area totals 317,374 sf at the main location and at the Marine Station and the Naturalist Center 9,100 sf. Space dedicated exclusively to exhibitions totals 168,648 sf at the main location and 7,000 sf at the Naturalist Center. Mixed-use space (for exhibitions as well as other public uses) at the main location totals 34,822 sf. A possible 13,645 sf is available for temporary exhibitions at the main location. NMNH anticipates an increase of 3,899 sf in public-use space in the near future.

NMNH has 51,906 sf of non-public space designated for exhibition support. Most of that area is occupied by taxidermy/model-making (25,000) and storage (15,991 sf). Other in-house functions with designated space are: conservation (2,987 sf), graphics/art production (2,655 sf), exhibition fabrication and maintenance (2,373 sf), exhibition assembly/preparation (593 sf), audiovisual/multimedia production (482 sf), film production (421 sf), design/detailing (393 sf), crate construction (296 sf), exhibition space construction (296 sf), photography (234 sf), and mount-making (185 sf). NMNH anticipates a decrease of 28,000 sf in support space in the near future.

Exhibition Activity

During Fiscal Years (FYs) 1999 and 2000, NMNH opened 15 exhibitions. Of those, NMNH organized three temporary exhibitions, which traveled to an average of five other venues. Six new permanent exhibitions opened, two temporary exhibitions opened, and one permanent exhibition space was reinstalled during this period. Three exhibitions were organized elsewhere, with NMNH serving as a venue.

Exhibitions are managed in five distinct stages:

1. Project definition subproject, including:
 - a. Concept and content development,
 - b. Research and evaluation,
 - c. Statement of purpose report,
 - d. Development and marketing, and
 - e. Project management.

2. Planning Phase, including:
 - a. Space plan,
 - b. Exhibit plan and design package,
 - c. Script package,
 - d. Formative evaluation and prototyping,
 - e. Education plan,
 - f. Development and public relations plan, and
 - g. Project management.
3. Development and production phase subproject, including:
 - a. Exhibit design and development,
 - b. Architectural modification and renovation,
 - c. Exhibit fabrication and production,
 - d. Education outreach,
 - e. Fundraising and marketing, and
 - f. Project management.
4. Close-out phase subproject, including:
 - a. Evaluations,
 - b. Punch lists,
 - c. Operations and maintenance,
 - d. Administrative close-outs, and
 - e. Project management.
5. Operation and maintenance phase, including:
 - a. Operation services,
 - b. Maintenance and repair services,
 - c. Ongoing education programs, and
 - d. Process management.

NMNH submitted statement of work templates and an example of its master schedule, created with Primavera Project Planner, which breaks down the work into principal functions.

Size and Content of Exhibitions

FY99-00 exhibitions occupied 45,514 sf of space at NMNH. Exhibitions averaged 3,251 sf. Not including the Rotunda reinstallation, the largest exhibitions were *African Voices* (6,500 sf), *Vikings* (6,000 sf), and *Pomo Indian Basket Weavers* (6,000 sf). The smallest exhibitions were *T. Rex* (30 sf) and *Frozen in Time* (20 sf). Exhibitions displayed 1687 objects; 784 (46%) were from Smithsonian collections. On average, exhibitions displayed four objects per 100 sf.

Exhibition Costs

Exhibitions opening in FY99-00 cost \$13,051,828 out-of-pocket⁵⁰. The most expensive exhibition per square foot was *African Voices* (\$1,000.00 per sf). The least expensive exhibition per square foot was *Pomo Indian Basket Weavers* (\$10.83 per sf). The mean cost per square foot for the 15 exhibitions was \$272.25. Out-of-pocket costs totaled \$1,042,000 (mean of \$106.12 per sf) for NMNH's original temporary exhibitions and \$2,272,027 (mean of \$284.89 per sf) for the three traveling exhibitions. The venue-only exhibitions costs totaled \$315,000 (mean of

⁵⁰ All expenditures discussed here include only exhibition-related costs and do not include: in-house staff, overhead costs, publications, brochures, public programs, and advertising.

\$45.83 per sf). New permanent exhibition costs totaled \$7,102,801 (mean of \$457.80 per sf) and reinstallation costs totaled \$2,385,000 (\$132.50 per sf). Costs for exhibition-related staff, including salary and benefits, were \$5,670,656 in FY99-00.⁵¹

Collaboration and Contracting

The OP&A questionnaire listed 36 exhibition-related services. On average, 12 of the listed services were contracted for each NMNH-originated temporary exhibition (including traveling exhibitions), five services were provided in-kind by an outside organization and/or individual, and seven services were provided by another Smithsonian unit.

For each new permanent exhibition or renovation, an average of eight services were contracted, one service was provided in-kind by an outside organization and/or individual, and three services were provided by another Smithsonian unit.

For each venue-only exhibition, an average of 11 services were contracted, less than one service was provided in-kind by an outside organization and/or individual, and three services were provided by another Smithsonian unit.

For those exhibition-related services⁵², NMNH paid contractors \$9,551,359 and reimbursed other Smithsonian units \$731,999. Other Smithsonian units also provided in-kind support estimated at a value of \$1,359,700. Outside organizations and/or individuals provided in-kind support estimated at \$1,866,000.

Exhibitions Staff

NMNH has 724 full-time equivalent (FTE) staff, including 43.5 exhibition-related FTEs (6% of all FTEs). Total costs for these exhibition-related staff were \$2,835,328 in FY00. Training expenditures for exhibition-related staff in FY00 totaled \$8,800.

Six departments report to the Associate Director for Public Programs, including:

- Exhibit Design and Development,
- Exhibit Production,
- Special Exhibits, and
- Education.

NMNH reported the time spent (in FTEs) during FY00 by exhibition-related staff on each of 25 activities listed by OP&A. NMNH exhibitions staff work in 22 areas: audiovisual (AV) production, conservation, curator/researcher, exhibition design, fabrication, film, graphic design, graphic production, installation, interactives, lighting, lighting installation, maintenance, management, marketing/public affairs, mount-making, multi-media production, paint/finishing, project management, registrar/collections, taxidermy, and writing.

Exhibition Design and Production Capability

Over the past three years, NMNH performed 30% of its exhibition design and graphic design work in-house and 98% of that work was rendered on computers. It did not use detailers to

⁵¹ Extrapolated from FY00 staff costs.

⁵² Services included research, design, and production services.

prepare production drawings. It provided graphic production, but not design, services to other Smithsonian units during the past three years.

Exhibition design and graphic design software used by NMNH includes: Adobe Photoshop, Adobe Illustrator, InDesign, MiniCAD, QuarkXpress, and Vectorworks. Graphic production is aided by an in-house large format output plotter (in use 100% of the year), mount-making equipment (100% in use), lamination/encapsulation capability with Sealeze (75% in use), silkscreening (50% in use), matting/framing (10% in use), faux finishing (1% in use), a HP 36-inch color inkjet printer, a vinyl cutter, Linotronic, illustration, and architectural and scale modeling. In the area of graphic production, NMNH would like to have a 50-inch large format inkjet printer, a high end scanner with transparency capabilities, a wide format scanner/copier, and a digital camera. It would also like to have use of NASM's router and NMAH Photo Services' transparency scanner.

NMNH has a basic production capability and has provided production services to other Smithsonian units during the past three years. Taxidermy and painting capabilities are in use 100% of the year. Other capabilities include: fine cabinetry (40% in use), general production (35% in use), electrical work (30% in use), Plexiglas work (25% in use), glasswork (10% in use), metalworking (5% in use), wall construction (3% in use), model-building (1% in use), and unusual finishes (1% in use). Equipment includes: a compound miter saw, a TIG welder, an arc welder, a metal lathe, a plasma cutter, a fleshing machine, a wire wheel degreaser, and two freezers. NMNH would like to have a CNC router. Alternatively, it would like to have use of NASM's CNC router and the Freer's drill machine.

NMNH did not produce any of its computer interactives in-house in the past three years, but it does have a fair amount of AV and multimedia equipment: 45 laser disk players, 30 DVD players, digital sound system/Soundscape, AVID Editing System/Vela=Rapid Access Computer, digital engineering/construction of custom electronic output devices (10% in use), and 30 interactive computers. NMNH also has these capabilities: digital lighting (50% in use), digital programming maintenance on computer interactives (40% in use), digital development and programming of simple computer interactives (3% in use), analog and digital recording on location (10% in use) and digital sound editing (10% in use), analog and digital film/video on location (10% in use), digital editing of film/video (10% in use), and digital animation (1% in use). NMNH would like to have a DVD authoring system. NMNH did use its equipment to provide AV and multimedia services to other SI units during the past three years.

Greatest Strengths and Weaknesses

NMNH reports that its three greatest strengths related to creating and presenting exhibitions are:

- Building consensus among team members – exhibit staff and content staff,
- Achieving educational goals of exhibitions, and
- Presenting visually exciting, entertaining, and educational exhibitions through the team process.

NMNH reports that its three greatest weaknesses related to creating and presenting exhibitions are:

- Insufficient funding – both federal and trust support,
- Scope creep, and
- Lack of steelwork capability, stonework capability, and in-house detailing capability

National Portrait Gallery

Background

The National Portrait Gallery (NPG) was established as a bureau of the Smithsonian Institution in 1962. It is housed in the Patent Office Building. NPG is part of the Smithsonian's American Museums and National Programs division.

Facility⁵³

NPG has 115,600 square feet (sf) in total assignable organization space; 112,000 sf is located at the main location and 3,600 sf is a cabinet shop and storage at the SISC. The public-use area at the main location totals 80,100 sf. Space dedicated exclusively to exhibitions totals 39,200 sf and mixed-use space (for exhibitions as well as other public uses) totals 4,200 sf. A possible 15,400 sf is available for temporary exhibitions. Due to continued space planning at the Patent Office Building, NPG was unable to report on any expected increase or decrease in public-use space in the near future.

NPG has 10,938 sf non-public space designated for exhibition support.⁵⁴ Most of that area is occupied by conservation (3,700 sf) and exhibition fabrication (2,120 sf). Other in-house functions with designated space are: graphics/art production (1,400 sf), photography (1,200 sf), design/detailing (1,100 sf), exhibition assembly and preparation (440 sf), storage (400 sf), object packing (378 sf), and audiovisual/multimedia production (200 sf). Due to continued space planning at the Patent Office Building, NPG was unable to report on any expected increase or decrease in support space in the near future.

Exhibition Activity

During Fiscal Years (FYs) 1999 and 2000, NPG opened 11 exhibitions. NPG organized ten exhibitions, four of which traveled to an average of four venues. One exhibition was organized elsewhere, with NPG serving as a venue.

Exhibitions are managed with the aid of a production schedule produced by the Office of Exhibitions. This schedule outlines milestones for individual exhibitions.

Size and Content of Exhibitions

FY99-00 exhibitions occupied 26,250 sf of space at NPG and averaged 2,386 sf. The largest exhibitions were *Franklin and His Friends*, *Hans Namuth*, and *Tête à Tête*, each at 4,000 sf and the smallest was *Recent Acquisitions* at 350 sf. Exhibitions displayed 825 objects; 357 (43%) were from Smithsonian collections. On average, exhibitions displayed three objects per 100 sf.

⁵³ All square footage reflects space prior to the Patent Office Building closure in January 2000.

⁵⁴ Conservation, graphics/art production, and photography spaces are shared with SAAM.

Exhibition Costs

Exhibitions opening in FY99-00⁵⁵ cost \$334,000 out-of-pocket⁵⁶. The most expensive exhibition per square foot was *George and Martha Washington* (\$45.45 per sf). The least expensive exhibition per square foot was *Recent Acquisitions* (\$2.86 per sf). The mean cost per square foot for the 11 exhibitions was \$15.80. Out-of-pocket costs for NPG's six original temporary exhibitions (not traveling) totaled \$194,000 (mean of \$19.09 per sf) and costs for its four traveling exhibitions totaled \$110,000 (mean of \$11.81 per sf). The venue-only exhibition cost \$30,000 (\$12.00 per sf). Costs for exhibition-related staff, including salary and benefits, for FY99-00 were \$2,441,345.⁵⁷

Collaboration and Contracting

The OP&A questionnaire listed 36 exhibition-related services. On average, one out of 36 listed services was contracted for each NPG-originated temporary exhibition, and one service was provided by another Smithsonian unit.

For the venue-only exhibition, one service was contracted and one service was provided by another Smithsonian unit.

For those exhibition-related services⁵⁸, NPG paid contractors \$8,950 and reimbursed Smithsonian units \$58,293. Other Smithsonian units provided in-kind support estimated at a value of \$12,000.

Exhibitions Staff

NPG has 75 full-time equivalent (FTE) staff, including 8.75 exhibition-related FTEs (12% of all FTEs). Total costs for these exhibition-related staff were \$1,953,076 in FY00.

Staff working on exhibitions are distributed throughout the organization. The organization has a flat structure, with major departments reporting to the Deputy Director, who reports to the Director.

Departments with exhibition-related staff include:

- Office of Exhibitions and Collections Management,
- Painting and Sculpture,
- Department of Prints and Drawings,
- Department of Photographs, and
- Office of Design and Production.

NPG reported the time spent (in FTEs) during FY00 by exhibition-related staff on each of 25 activities listed by OP&A. NPG exhibitions staff worked in 15 areas: conservation, crating, curator/researcher, exhibition design, education, fabrication, graphic design, graphic production,

⁵⁵ Due to the Patent Office Building (POB) closure in January 2000, the last NPG exhibition opened in the POB on October 29, 1999.

⁵⁶ All expenditures discussed here include only exhibition-related costs and do not include: in-house staff, overhead costs, publications, brochures, public programs, and advertising.

⁵⁷ Extrapolated from FY00 staff costs to reflect 1.25 years of costs.

⁵⁸ Services included research, design, and production services.

management, marketing/public affairs, matting, photography, project management, registrar/collections, and writing.

Exhibition Design and Production Capability

Over the past three years, NPG performed 100% of its exhibition design work in-house; none of that work was rendered on computers. In addition, 100% of graphic design work was completed in-house and 93% was done on computers. It did not use detailers to prepare production drawings. It provided design, but not graphic production, services to other Smithsonian units during the past three years.

Exhibition design and graphic design software used by NPG includes: Adobe Photoshop, Adobe Illustrator, InDesign, Streamline, and QuarkXpress. Unusual in-house design equipment includes: a HP Design Jet large format color printer and a Xante 3G laser printer. Graphic production is aided by an in-house a large format output plotter (in use 100% of the year) and a complete silkscreen shop (100% in use) including a water based system and in-house film production. For exhibition design, NPG would like to have a color laser printer, hardware and software upgrades, and a color proof light system. In the area of graphic production, NPG would like to have a lamination system.

NPG has a basic production capability; it has not provided production services to other Smithsonian units during the past three years. General production, fine cabinetry, matting/framing, unusual finishes, and Plexiglas capabilities at NPG are used 100% of the year. Other capabilities and equipment include: reproduction of wood moldings and architectural details and a laser level. NPG would like to have a panel sander and a CNC router. It would also like to have use of NASM's Gerber router, Garber's metal cleaning dip tanks, and OEC's wide panel sander.

NPG has some audiovisual and multimedia equipment, but has not recently produced any computer interactives in-house. NPG has these capabilities: analog recording in studio and on location, analog sound editing, analog and digital film/video in studio and on location, and analog film/video editing. NPG would like to have DVD recording capability and the use of NASM's slide/video technical support.

Principal Strengths and Weaknesses

NPG reports that its three greatest strengths related to creating and presenting exhibitions are:

- Creative, experienced, dedicated staff,
- Design strength, and
- The ability to convey information to visitors.

NPG reports that its three greatest weaknesses related to creating and presenting exhibitions are:

- Lack of money,
- A shortage of marketing/publicity capacity in-house, and
- An inadequate financial management system.

National Postal Museum

Background

The National Postal Museum (NPM) grew out of the National Philatelic Collection, established at the Smithsonian Institution in 1886. The museum itself was established in 1990 under an agreement between the Smithsonian and the United States Postal Service. NPM opened its own facility in the lower level of the former Washington City Post Office Building at First Street and Massachusetts Avenue in 1993. NPM is part of the Smithsonian's AMNP division.

Facility

NPM has 56,000 square feet (sf) in total assignable organization space, all located at the museum. The public-use area totals 32,552 sf. Space dedicated exclusively to exhibitions totals 21,520 sf and mixed-use space (for exhibitions as well as other public uses) totals 7,779 sf. A possible 1,419 sf is available for temporary exhibitions. NPM does not anticipate any increase or decrease in public-use space in the near future.

NPM has 4,023 sf of non-public space designated for exhibition support. Most of that area is occupied by conservation (1,044 sf) and storage (1,000 sf). Other in-house functions with designated space are: exhibition assembly/preparation (917 sf), graphics/art production (368 sf), photography (351 sf), and design/detailing (343 sf). NPM does not anticipate any increase or decrease in support space in the near future.

Exhibition Activity

During Fiscal Years (FYs) 1999 and 2000, NPM opened three temporary exhibitions. NPM organized one exhibition itself and co-organized two other exhibitions: one with U.S. Postal Inspection Services and one with the Legacy Project.

Exhibitions are scheduled on one Gantt chart by gallery, opening date, and closing date. Activities for each exhibition are tracked on a separate spreadsheet. These activities are related to the script, design, internal Smithsonian reviews, fabrication, gallery preparation, installation, objects, loans, security, press materials, and the opening event.

Size and Content of Exhibitions

FY99-00 exhibitions occupied 936 sf of space at NPM and averaged 312 sf. The largest exhibition was *Mayhem By Mail* (650 sf) and the smallest was *Missing You: Last Letters from WWII* (86 sf). Exhibitions displayed 88 objects; eight (9%) were from Smithsonian collections. On average, exhibitions displayed nine objects per 100 sf.

Exhibition Costs

Exhibitions opening in FY99-00 cost \$91,700 out-of-pocket⁵⁹. The most expensive exhibition per square foot was *Mayhem by Mail* (\$127.69 per sf). The least expensive exhibition per square foot was *Missing You: Last Letters from WWII* (\$17.44 per sf). The mean cost per square foot

⁵⁹ All expenditures discussed here include only exhibition-related costs and do not include: in-house staff, overhead costs, publications, brochures, public programs, and advertising.

for the six exhibitions was \$60.38. Costs for exhibition-related staff, including salary and benefits, for FY99-00 were \$727,880.⁶⁰

Collaboration and Contracting

The OP&A questionnaire listed 36 exhibition-related services. On average, four of the listed services were contracted for each temporary exhibition, one service was provided in-kind by an outside organization and/or individual, and less than one service was provided by another Smithsonian unit.

For those exhibition-related services⁶¹, NPM paid contractors \$91,200. Other Smithsonian units provided in-kind support estimated at a value of \$100. Outside organizations and/or individuals provided in-kind support estimated at \$13,000.

Exhibitions Staff

NPM has 84 full-time equivalent (FTE) staff, including 5.95 exhibition-related FTEs (12% of all FTEs). Total costs for exhibition-related staff were \$363,940 in FY00. Training expenditures for exhibition-related staff in FY00 totaled \$700.

NPM's staff are distributed among eight departments reporting to the Director. Staff working on exhibitions are primarily located in three departments: Interpretive Services, Collections Management Services, and Exhibit Services.

NPM reported the time spent (in FTEs) during FY00 by exhibition-related staff on each of 25 activities listed by OP&A. NPM exhibitions staff work in eight areas: conservation, curator/researcher, fabrication, maintenance, management, marketing/public affairs, photography, and registrar/collections.

Exhibition Design and Production Capability

Over the past three years, NPM performed 50% of its exhibition design work in-house and 100% of that work was rendered on computers. In addition, 10% of its graphic design work was completed in-house and all done on computers. It used contract detailers to prepare production drawings. It did not provide design or graphic production services to other Smithsonian units during the past three years.

Exhibition design and graphic design software used by NPM includes: Adobe Photoshop, Adobe Illustrator, and Quark. Graphic production is aided by an in-house lamination/encapsulation capability (in use 25% of the year) and a large format output plotter (10% in use). For design, NPM would like to have a full-time graphic designer on staff. In the area of graphic production, NPM would like to have a large format color laser jet printer. It would also like to have use of the vinyl letter cutting equipment at OEC or NMNH.

NPM has a limited production capability and has not provided production services to other Smithsonian units during the past three years. General production, matting/framing, and mount-making capabilities at NPM are used 5% of the year.

⁶⁰ Extrapolated from FY00 staff costs.

⁶¹ Services included research, design, and production services.

NPM does not have an in-house audiovisual or multimedia production capability, but it does have some equipment: two DVD players, an LCD projector, and an Insight 3X lighting controller.

Principal Strengths and Weaknesses

NPM reports that its three greatest strengths related to creating and presenting exhibitions are:

- Ability to work with partners outside of the Smithsonian,
- Strong creative teams, and
- Ability to interpret seemingly mundane subjects well for a broad audience.

NPM reports that its two greatest weaknesses related to creating and presenting exhibitions are:

- Failure to focus exhibits on its own collections, and
- Inability to secure adequate funding to support new exhibits.

National Zoological Park

Background

The National Zoological Park (NZN), established in 1889, is located in Rock Creek Park. NZN also manages the Conservation and Research Center (CRC) in Front Royal, Virginia. The Zoo is part of the Smithsonian's Science division.

Facility

The Zoo has 15,432,771 square feet (sf) in total assignable organization space; 1,093,244 sf is located indoors and 143,395,276 sf is outdoors. Indoor space totals 624,610 sf at the main location and 468,634 sf at the CRC. The indoor public-use area at the main location totals 247,689 sf. Indoor space dedicated exclusively to exhibitions totals 106,110 sf and mixed-use space (for exhibitions as well as other public uses) totals 107,535sf. A possible 3,425 sf is available for indoor temporary exhibitions. At the main location, outdoor space totals 6,649,910 sf and at the CRC, 136,745,366 sf. The outdoor public-use area at the Zoo totals 4,809,900 sf and space dedicated exclusively to exhibitions totals 1,620,040 sf. NZN does anticipate an increase in public-use space of 6,000 sf in the near future.

NZN has 12,325 sf non-public space designated for exhibition support. Most of that area is occupied by graphics/art production (4,425 sf). Other in-house functions with designated space are: exhibition fabrication (3,400 sf), design/detailing (3,300 sf), photography (900 sf), and audiovisual/multimedia production (300 sf). NZN does not anticipate any increase or decrease in support space in the near future.

Exhibition Activity

During Fiscal Years (FYs) 1999 and 2000, NZN opened four new permanent exhibitions.

In 2001, NZN revised the 8-page "Guidelines for Creating Exhibits at the National Zoological Park," in which the process, players, goals, and key documents are outlined.

Size and Content of Exhibitions

FY99-00 exhibitions occupied 36,430 sf of space at NZN. Exhibitions averaged 9,107 sf. The largest exhibition was *American Prairie* (21,780 sf) and the smallest was *How Do You Zoo?* (500 sf). Exhibitions displayed 21 objects or animals, all from Smithsonian collections. On average, exhibitions displayed six objects per 10,000 sf.

Exhibition Costs

Exhibitions opening in FY99-00 cost \$7,707,732 out-of-pocket⁶². The most expensive exhibition per square foot was *Great Cats* (\$363.50 per sf). The least expensive exhibition per square foot was *How Do You Zoo?* (\$106.00 per sf). The mean cost per square foot for the four exhibitions was \$211.10. Costs for exhibition-related staff, including salary and benefits, for FY99-00 were \$2,209,200.⁶³

⁶² All expenditures discussed here include only exhibition-related costs and do not include: in-house staff, overhead costs, publications, brochures, public programs, and advertising.

⁶³ Extrapolated from FY00 staff costs.

Collaboration and Contracting

The OP&A questionnaire listed 36 exhibition-related services. On average, 15 of the listed services were contracted for each exhibition, one service was provided in-kind by an outside organization and/or individual, and less than one service was provided by another Smithsonian unit.

For those exhibition-related services⁶⁴, NZP paid contractors \$7,7067,734. Other Smithsonian units provided in-kind support estimated at a value of \$9,000. Outside organizations and/or individuals provided in-kind support estimated at \$33,000.

Exhibitions Staff

NZP has 337 full-time equivalent (FTE) staff, including 13.5 exhibition-related FTEs (4% of all FTEs). Total costs for these exhibition-related staff were \$1,046,000 in FY00. Training expenditures for exhibition-related staff in FY00 totaled \$4,000.

Staff working on exhibitions are distributed throughout the organization. The organization has a relatively flat structure, with six departments reporting to the Deputy Director, who, in turn, reports to the Director.

Departments with exhibition-related staff are:

- Exhibits and Outreach Directorate (includes Exhibits Department), and
- Facilities Department (includes Project Management Division).

NZP reported the time spent (in FTEs) during FY00 by exhibitions-related staff on each of 25 activities listed by OP&A. NZP exhibitions staff work in 12 areas: administration, curator/researcher, fabrication, graphic design, graphic production, installation, maintenance, management, photography, project managers, visitor research, and writing.

Exhibition Design and Production Capability

NZP contracts all of its exhibition design work (including detailing), but produced 20% of its graphic design work in-house and 100% of that work was done on computers. It provided graphic production services to other Smithsonian units during the past three years.

Exhibition design and graphic design software used by NZP includes: Adobe Photoshop, Adobe Illustrator, and QuarkXpress. Graphic production is aided by an in-house lamination/encapsulation capability (in use 50% of the year), vinyl letter output capability (100% in use), a vinyl printer, and a vinyl cutter. In the areas of design and graphic production, NZP would like to have a large color copier, a large format copier, and a large scale digital printer.

NZP has limited production capability, but provided production services to other Smithsonian units during the past three years. Electrical work, metalworking, and painting capabilities at NZP are used 100% of the year. Other capabilities include: stonework (25% in use), wall construction (20% in use), general production (10% in use), castings (5% in use), glasswork

⁶⁴ Services included research, design, and production services.

(5%), fine cabinetry (1% in use), Plexiglas (1%), unusual finishes (1% in use), welding, and animal exhibit and containment construction.

NZP has a well-developed in-house audiovisual and multimedia production capability. NZP can produce live video and streaming video over the Web with the use of its 12 streaming Web cameras and five still image Web cameras. NZP also has the following capabilities and equipment: analog and digital recording on location (0% in use), digital sound editing (0% in use), analog and digital film/video on location (5% in use), digital film/video editing, and digital development and programming of computer interactives. NZP would like to have Beta SP copying equipment, DVD production equipment, and use of SI Productions' sound editing equipment.

Principal Strengths and Weaknesses

NZP reports that its three greatest strengths related to creating and presenting exhibitions are:

- A team exhibit planning process,
- Creativity of its exhibit teams, and
- Consideration of ADA requirements.

NZP reports that its three greatest weaknesses related to creating and presenting exhibitions are:

- A shortage of sufficient design and exhibit staff,
- Insufficient money to maintain, prototype, and evaluate exhibits, and
- Lack of evaluation staff.

Office of Exhibits Central

Background

The Office of Exhibits Central (OEC) began operations in 1974. It was founded to provide exhibit design and production resources to all Smithsonian bureaus and offices that do not have in-house capabilities and to provide specialized exhibit resources to all Smithsonian units. OEC reports to the Under Secretary for American Museums and National Programs.⁶⁵

Facility

OEC, a unit devoted to exhibition and program support, has 23,700 square feet (sf) in total assignable organization space located at SISC (1111 North Capital Street). Most of that area is occupied by exhibition fabrication (11,200 sf). Other functions with designated space are: taxidermy/model-making (3,520 sf), graphics/art production (3,040 sf), design/detailing (1,920 sf), and storage (1,440 sf). Many functions share space. The exhibition fabrication area is also used for crate/case storage, object packing, and crate construction. The graphics area is also used for exhibition assembly and preparation. OEC anticipates an increase of 800 sf in support space in the near future.

Exhibition Activity

OEC worked on 92 projects related to exhibitions opening during Fiscal Years (FYs) 1999 and 2000. SITES was OEC's most frequent client with 27 projects, followed by NMNH (14 projects) and NMAH (11 projects). Offices in the Castle were the clients for nine projects and one project was requested by TSA.⁶⁶

Exhibition Costs

Projects related to exhibitions opening in FY99-00 cost \$2,213,130 out-of-pocket.⁶⁷ The most expensive project, *Spirit of the Ainu* for NMNH, totaled \$2,213,130 and the least expensive, a case loan for the Center for African American History and Culture's *Locating the Spirit*, totaled \$0.40.

The in-kind staff labor for these projects is estimated at \$1,733,097. The most expensive project, *Spirit of the Ainu*, totaled \$336,240 and the least expensive, the first refurbishment of SITES' *Women in Flight*, totaled \$25.42.

Clients were charged a total of \$480,033. The highest fee charged, for *Spirit of the Ainu*, was \$100,928 and the lowest fee, for the refurbishment of *Barn Again!* was \$0.17. Costs for exhibition-related staff, including salary and benefits, for FY99-00 were \$4,605,000.⁶⁸

⁶⁵ As of March 2002. At the time of data collection, OEC reported to the Under Secretary for Finance and Administration.

⁶⁶ Castle offices and TSA were the only OEC clients not surveyed for the Exhibitions Study.

⁶⁷ Out of pocket is defined here as the expenditures for materials and services, and does not include staff costs.

⁶⁸ Extrapolated from FY00 staff costs.

Exhibitions Staff

OEC has 39 full-time equivalent (FTE) staff, including 32.5 exhibition-related FTEs (83% of all FTEs). Total costs for the exhibition-related staff were \$2,302,500 in FY00. Training expenditures for exhibition-related staff in FY00 totaled \$16,800.

OEC has three units: Design, Editing and Graphics (DEG), Fabrication, and Model Shop. Each unit has a supervisor who reports to the Director. The supervisor of the DEG unit is also the Assistant Director for Programs. OEC also has a Project Administrator and an Administrative Officer on staff who report to the Director.

OEC reported the time spent (in FTEs) during FY00 by exhibitions-related staff on each of 25 activities listed by OP&A. OEC exhibitions staff work in 15 areas: crating, design, detailing, fabrication, graphic design, graphic production, installation, lighting installation, IT support, management/administration, model-making, mount-making, project management, taxidermy, and writing.

Exhibition Design and Production Capability

Over the past three years, OEC has rendered 90% of its design work on computers. In addition, 100% of its graphic design work was completed on computers. It used contract detailers to prepare production drawings.

Design and graphic design software used by OEC includes: Adobe Photoshop, Adobe Illustrator, InDesign, Pagemaker, StudioPro, QuarkXpress, and Vectorworks. Unusual in-house design equipment includes: a HP plotter, a scanner with transparency adapter, and a CD burner. Unusual capabilities include: renderings, scale models, 3D computer models, brochure design, and fly throughs. Graphic production is aided by an in-house large format output plotter (in use 100% of the year), lamination/encapsulation capability (100% in use), silkscreening (100% in use), vinyl letter output capability (100% in use), cold mount press, dry mount press, conservation matting and framing, engraving, gilding/goldleafing, miter saw, large scale photo enlargement, plate maker, sandblasting, and sign painting. For design, OEC would like to have a plotter, a Lambda printer, advanced special effect software (e.g., Alias and Macromedia Director), and larger monitors. In the area of graphic production, OEC would like to have a new miter saw, a 48-inch plotter, and an attachment for the matcutter for cutting ovals. It would also like to have use of NASM's plotter, Gerber edge and router, OIPP's color printer and color Xerox, SIL's large scanner bed, and the Rigging department's computer engraver.

OEC reported on the production capabilities of two of its units: Fabrication and Model-Making. In the fabrication unit, the fine cabinetry and Plexiglas capabilities are used 100% of the year. Other capabilities include: general production (40% in use), unusual finishes (20% in use), model-building (10% in use), metal working (10% in use), artifact cavity packing, and custom crating. For the Fabrication unit, OEC would like to have a CNC router, a SAS moulder, and an Edgebander. It would also like to have use of NASM's CNC router and NZP's large metal break.

In the Model-Making unit, OEC has model-building and mount-making capabilities (in use 40% of the year). Other capabilities include: mannequins (10% in use), metal working (5% in use),

castings (5% in use), highly customized products, portrait figures, facsimiles, and reproduction artifacts. Special equipment includes: a vacuum casting chamber, a centrifugal casting machine, a mortising machine, a precision jig saw, a TIG welder, and a plasma cutter. For the Model-Making unit, OEC would like new plexi benders, a disk sander, metal bending equipment, a new larger vacuum forming machine, better lighting and ventilation systems, clean work areas, more space, and a metal worker on staff.

OEC does not have an in-house audiovisual or multimedia production capability.

Principal Strengths and Weaknesses

OEC reports that its three greatest strengths related to creating and presenting exhibitions are:

- Design, editing, and production of traveling exhibitions,
- Custom model-making (dioramas, mannequins, bracket making), and
- Efficient and effective fabrication of custom exhibition casework.

OEC reports that its three greatest weaknesses related to creating and presenting exhibitions are:

- Detailing,
- Graphic design, and
- Lack of a project management office.

Smithsonian American Art Museum

Background

The collections that now comprise the Smithsonian American Art Museum (SAAM) were initially established in 1846. After being housed in various buildings, including the Natural History building, the museum was first administered as a separate bureau of the Smithsonian in 1920 and in 1968 the collections were consolidated in the Patent Office Building. In 1972, the then-named National Collection of Fine Arts acquired the Renwick Gallery, which houses the American craft collection. The museum adopted its current name in 2000. SAAM is part of the Smithsonian's American Museums and National Programs division.

Facility⁶⁹

SAAM has 190,970 square feet (sf) in total assignable organization space; 136,470 sf is located at the main location, 34,700 sf is located at the Renwick, and 19,800 sf is off-site storage and offices (SISC, 601 Indiana Ave, and Artex). The public-use area totals 67,970 sf at the main location and 22,000 sf at the Renwick. Space dedicated exclusively to exhibitions totals 55,800 sf at the main location and 18,000 sf at the Renwick. Mixed-use space (for exhibitions as well as other public uses) totals 7,100 sf at the main location and 3,400 sf at the Renwick. There is a possible 16,000 sf available for temporary exhibitions at the main location and 21,400 sf at the Renwick. In the near future, SAAM anticipates an increase in its public display space of 23,000 sf.

SAAM has 12,200 sf of non-public space designated for exhibition support. Most of that area is occupied by conservation (3,200 sf), storage (2,300 sf), and exhibition fabrication (2,000 sf). Other in-house functions with designated space are: frame shop (900 sf), design/detailing (850 sf), object packing (800 sf), photography (600 sf), exhibition assembly and preparation (450 sf), matting and framing (450 sf), exhibition maintenance (400 sf), and graphics/art production (250 sf). In the near future, SAAM anticipates a decrease in support space of 2,000 sf.

Exhibition Activity

During Fiscal Years (FYs) 1999 and 2000, SAAM opened 27 exhibitions. Of those, SAAM organized 18, including nine traveling exhibitions reaching an average of eight venues each.⁷⁰ Three permanent exhibition spaces were reinstalled and objects were rotated in one gallery during this period. Five exhibitions were organized elsewhere, with SAAM serving as a venue.

Size and Content of Exhibitions

FY99-00 exhibitions occupied 26,250 sf of space at SAAM and averaged 3,461 sf.⁷¹ Aside from reinstallations, the largest exhibition was *Picturing Old New England* (7,000 sf) and the smallest were *David Beck's L'Opera*, *Hiratsuka Prints*, and *African American Art* each at 650 sf. Exhibitions displayed 1499 objects, 974 (65%) from Smithsonian collections. On average, exhibitions displayed two objects per 100 sf.

⁶⁹ All square footage reflects space prior to the Patent Office Building closure in January 2000.

⁷⁰ Eight *Treasures to Go* exhibitions and one exhibition that showed both at SAAM and at seven other venues.

⁷¹ Henceforth, all SAAM figures include activities at the Renwick.

Exhibition Costs

SAAM provided an exhibition prospectus, within which is a section on budget. The projected trust and federal costs for various services provided and materials required for each exhibition are listed under six major categories (curatorial, registrar, design and production, publications and new media, educational programs, and development).

Exhibitions opening in FY99-00⁷² cost \$1,509,978 out-of-pocket⁷³. The most expensive exhibition per square foot was *Hopper Watercolors* (\$35.00 per sf). The least expensive exhibition per square foot was the rotation of the *Renwick Permanent Collection Gallery* (\$0.25 per sf). The mean cost per square foot for the 27 exhibitions was \$13.53. Out-of-pocket costs totaled \$322,500 (mean of \$7.91 per sf) for SAAM's original temporary exhibitions and \$813,478 (mean of \$20.49 per sf) for the traveling exhibitions. Venue-only exhibitions totaled \$287,000 (mean of \$18.67 per sf). The reinstallations costs totaled \$86,000 (mean of \$5.33 per sf) and the Renwick permanent gallery rotation totaled \$1,000 (\$0.25 per sf). Costs for exhibition-related staff, including salary and benefits, were \$2,787,500 in FY99-00.⁷⁴

Collaboration and Contracting

For those exhibition-related services⁷⁵, SAAM paid contractors \$474,400 and reimbursed other Smithsonian units \$79,400. Other Smithsonian units also provided in-kind support estimated at a value of \$200.

The OP&A questionnaire listed 36 exhibition-related services. On average, three of the listed services were contracted for each SAAM-originated temporary exhibition and less than one service per exhibition was provided by another Smithsonian unit.

For each venue-only exhibition, an average of four services were contracted and one service was provided by another Smithsonian unit.

Exhibitions Staff

SAAM has 121 full-time equivalent staff (FTE), including 41 exhibition-related FTEs (34% of all FTEs). Total costs for these exhibition-related staff were \$2,300,000 in FY00. Training expenditures for exhibition-related staff in FY00 totaled \$1,500.

Staff working on exhibitions are distributed throughout the organization. The organization has a flat structure, with major departments reporting to the Director.

⁷² Due to the Patent Office Building (POB) closure in January 2000, the last SAAM exhibition opened in the POB on October 1, 1999, though exhibitions continue to open on the road and at the Renwick.

⁷³ All expenditures discussed here include only exhibition-related costs and do not include: in-house staff, overhead costs, publications, brochures, public programs, and advertising.

⁷⁴ Extrapolated from FY00 staff costs to reflect 1.25 years of costs.

⁷⁵ Such services include research, design, and production services.

Departments with exhibition-related staff are:

- Curatorial Office,
- Renwick Gallery,
- Registrar's Office, and
- Exhibitions Office.

SAAM reported the time spent (in FTEs) during FY00 by exhibition-related staff on each of 25 activities listed by OP&A. SAAM exhibitions staff worked in 20 areas: conservation, crating, curator/researcher, exhibition design, fabrication, graphic design, graphic production, installation, lighting installation, lighting, management, marketing/public affairs, matting/framing/frame restoration, mount-making, multimedia, photography, project management, registrar/collections, special events, and writing.

Exhibition Design and Production Capability

Over the past three years, SAAM performed 99% of its exhibition design work in-house and 80% of that work was rendered on computers. In addition, 99% of graphic design work was completed in-house with 99% of it done on computers. It used detailers to prepare production drawings, but did not contract this service. SAAM provided design and graphic production services to other Smithsonian units during the past three years.

Exhibition design and graphic design software used by SAAM includes: Adobe Illustrator, Cinema 4D, and Quark. Unusual in-house design equipment includes a HP 36-inch wide color printer. Graphic production is aided by an in-house plotter with large format output (in use 80% of the year) and silkscreen capability (10% in use). For exhibition design, SAAM would like to have more in-house video capabilities, a laminating press, space to store equipment, and a full-time position for the production and development of interactive prototypes. In the area of graphic production, SAAM would like to have large format lamination/encapsulation. In general, SAAM finds it more efficient to use an outside service bureau for graphic production.

SAAM has a basic production capability; however, it has not provided production services to other Smithsonian units during the past three years. Fabrication capabilities include: matting/framing (in use 95% of the year), fine cabinetry (75% in use), general production (15% in use), model-building (5% in use), and mount-making (5% in use). SAAM would like to have use of NPG's laser leveler.

All of SAAM's audiovisual and multi-media production is completed in-house; it has not recently provided services to other Smithsonian units. SAAM has the following capabilities: analog and digital recording on location (10% in use), analog filming/video on location (5% in use), and development and programming of analog and digital interactives (20% in use).

Principal Strengths and Weaknesses

SAAM reports that its three greatest strengths related to creating and presenting exhibitions are:

- Creative, experienced staff that works as a team,
- Strong lighting design capabilities, and
- A multi-talented/cross trained staff, who are constantly focusing on new technologies to increase efficiency and productivity.

SAAM reports that its three greatest weaknesses related to creating and presenting exhibitions are:

- Lack of financial resources to achieve a higher level of finish,
- Lack of staff to create more sophisticated interactives, space, and equipment, and
- Maintaining all office computers with the latest versions of programs.

Smithsonian Institution Archives

Background

The Smithsonian Institution Archives (SIA) serves as the institutional memory for the Smithsonian Institution. Established in 1891, SIA appraises, acquires, and preserves the records of the Institution and related documentary materials. The SIA reports to the Chief Technology Officer under the Secretary of the Smithsonian.⁷⁶

Facility

SIA has 27,050 square feet (sf) in total assignable organization space; 12,000 sf is located at the main location in the A&I Building, 7,500 sf at National Underground Storage, 5,700 sf at the Fullerton facility, and 1,850 sf at SISC. The public-use area at the main location totals 771 sf. There is no space dedicated exclusively to exhibitions, however, mixed-use space (for exhibitions as well as other public uses) totals 39 sf. A possible 39 sf is available for temporary exhibitions. SIA does not anticipate any change in the amount of public-use space in the near future. SIA has no non-public space designated for exhibition support.

Exhibition Activity

During Fiscal Years (FYs) 1999 and 2000, SIA organized and opened three exhibitions.

Size and Content of Exhibitions

FY99-00 exhibitions occupied 67 sf of space at the Smithsonian Institution Building (Castle) and A&I. Exhibitions averaged 22 sf. The largest exhibitions were *Baird's Dream: A History of the Arts and Industries Building* and *The Smithsonian at the Turn of the Century*, each at 28 sf and the smallest was *Joseph Henry: Online and in the News* at 11 sf. Exhibitions displayed 100 objects; 91 (75%) were from Smithsonian collections. On average, exhibitions displayed 15 objects per 10 sf.

Exhibition Costs

Exhibitions opening in FY99-00 cost \$78 out-of-pocket.⁷⁷ The most expensive exhibition per square foot was *Joseph Henry: Online and in the News* (\$2.58 per sf). The least expensive exhibition per square foot was *The Smithsonian at the Turn of the Century* (\$0.88 per sf). The mean cost per square foot for the three exhibitions was \$1.45. Costs for exhibition-related staff, including salary and benefits, were \$93,730 in FY99-00.⁷⁸

⁷⁶ As of March 2002. At the time of data collection, the Chief Technology Officer reported to the Under Secretary for Finance and Administration.

⁷⁷ All expenditures discussed here include only exhibitions-related costs and do not include: in-house staff, overhead costs, publications, brochures, public programs, and advertising.

⁷⁸ Extrapolated from FY00 staff costs.

Collaboration and Contracting

The OP&A questionnaire listed 36 exhibition-related services. On average, less than one of the listed services were contracted for these exhibitions, and one service was provided by another Smithsonian unit.

For those exhibition-related services⁷⁹, SIA paid contractors \$28. Other Smithsonian units provided in-kind support estimated at a value of \$100.

Exhibitions Staff

SIA has 26 full-time equivalent (FTE) staff, of which just 0.23 FTEs are exhibition-related (1% of all FTEs). Total costs for these exhibition-related staff were \$46,865 in FY00. SIA spent no money on training for exhibition-related staff.

The SIA is divided into three divisions: Archives, Technical Services, and Institutional History. Exhibitions are created by the Institutional History staff. SIA reported the time spent (in FTEs) during FY00 by exhibitions-related staff on each of 25 activities listed by OP&A. SIA exhibitions staff work in two areas: curators/researchers and management/administration.

Exhibition Design and Production Capability

Over the past three years, SIA performed 100% of its exhibition design work in-house and 10% of that work was rendered on computers. In addition, 100% of its graphic design work was completed in-house and done on computers. It did not use detailers to prepare production drawings. It did not provide design and graphic production services to other Smithsonian units during the past three years.

SIA uses Adobe Photoshop for its exhibition design and graphic design software. It has no unusual in-house design equipment or capabilities.

SIA has no graphic production equipment or capabilities, but it would like to have a larger scanner and a large format printer.

SIA has no exhibition fabrication capabilities, but it would like to have use of NZP's mat cutter.

SIA has limited in-house audiovisual and multimedia production capability and has not produced any computer interactives in the past three years. It has analog audio recording on-location capabilities that it uses 75% of the time. In the past three years, SIA has not used its audiovisual equipment to provide services to other SI units.

Principal Strengths and Weaknesses

SIA reports that its three greatest strengths related to creating and presenting exhibitions are:

- Knowledge of content,
- Original materials in our collections, and
- Awareness of public interest.

⁷⁹ Services included research, design, and production services.

SIA reports that its three greatest weaknesses related to creating and presenting exhibitions are:

- Its very limited budget,
- Limited fabrication facilities, and
- Lack of an in-house exhibits editor.

Smithsonian Institution Libraries

Background

The Smithsonian Institution Libraries (SIL) has 22 branch libraries and electronic resources available online. The collections consist of 1.5 million volumes with 40,000 rare books including especially strong holdings in most of the Institution's historical disciplines. SIL offers information resources to Institution staff, visiting researchers, and the public through on-site collections and electronic services. In addition to providing library and information services to Smithsonian staff and the public, SIL presents public programs, including exhibitions, lectures, and symposia. SIL reports to the Under Secretary for AMNP.⁸⁰

Facility

SIL's main location is at the National Museum of Natural History (NMNH). SIL's 22 branches are located in Washington, D.C., in Suitland and Edgewater, Maryland, in New York City, and in the Republic of Panama. SIL has 100,760 square feet (sf) in total assignable organization space. It has over 100,000 sf of public-use space devoted to its 22 libraries. The SIL exhibition gallery at NMAH has 760 sf dedicated exclusively to exhibitions and is available for temporary exhibitions. There is no non-public exhibition support space. SIL does not anticipate any increase or decrease in public-use space in the near future.

Exhibition Activity

During Fiscal Years (FYs) 1999 and 2000, SIL opened two temporary exhibitions: *Frontier Photographer: Edward S. Curtis* and *Make the Dirt Fly*.

Size and Content of Exhibitions

FY99-00 exhibitions occupied 1,800 sf of space at SIL at 900 sf each. Exhibitions displayed 106 objects; 102 (96%) were from Smithsonian collections. On average, exhibitions displayed six objects per 100 sf.

Exhibition Costs

Exhibitions opening in FY99-00 cost \$27,063 out-of-pocket.⁸¹ The most expensive exhibition per square foot was *Frontier Photographer Curtis* (\$17.72 per sf). The least expensive exhibition per square foot was *Make the Dirt Fly* (\$11.24 per sf). The mean cost per square foot for the two exhibitions was \$14.48. Costs for exhibition-related staff, including salary and benefits, were \$130,000 in FY99-00.⁸²

Collaboration and Contracting

The OP&A questionnaire listed 36 exhibition-related services. On average, 19 services were provided by another Smithsonian unit.

⁸⁰ As of March 2002. At the time of data collection, SIL reported to the Under Secretary for Finance and Administration.

⁸¹ All expenditures discussed here include only exhibition-related costs and do not include: in-house staff, overhead costs, publications, brochures, public programs, and advertising.

⁸² Extrapolated from FY00 staff costs.

For those exhibition-related services⁸³, SIL reimbursed other Smithsonian units \$27,063.

Exhibitions Staff

SIL has 111 full-time equivalent (FTE) staff. Total costs for exhibition-related staff were \$65,000 in FY00.

SIL reported the time spent (in FTEs) during FY00 by exhibition-related staff on each of 25 activities listed by OP&A. SIL exhibitions staff work in 12 areas: management/administration, project management, curators/researchers, registrar/collections, exhibition design, writing/editing, photography, conservation, mount/bracket makers, graphic design, lighting design, and marketing/public affairs.

Exhibition Design and Production Capability

SIL has no exhibition design, graphic design, graphic production, fabrication, or audiovisual/multimedia capabilities. However, it would like to have use of NMAH's interactive computer terminals and the sound and video equipment held by the Audiovisual unit.

Principal Strengths and Weaknesses

SIL reports that its three greatest strengths related to creating and presenting exhibitions are:

- Integrating objects and books,
- Working with guest curators to turn their ideas into scripts, and
- Developing public programs to complement and extend the exhibition themes.

SIL reports that its three greatest weaknesses related to creating and presenting exhibitions are:

- Ineffective techniques for raising funds for small exhibitions,
- Lack of full time staff dedicated to exhibitions, and
- Lack of enough training in the current techniques for exhibition display.

⁸³ Services included research, design, and production services.

Smithsonian Institution Traveling Exhibition Service

Background

Since 1952, the Smithsonian Institution Traveling Exhibition Service (SITES) has been sharing the wealth of the Smithsonian's collections, research, and exhibitions with audiences around the world. SITES is the largest traveling exhibition service in the world. SITES reports to the Under Secretary for American Museums and National Programs.

Facility

SITES has 11,889 square feet (sf) in total assignable organization space. The unique nature of SITES is that it is purely a traveling entity and, therefore, requires no space for exhibition display.

SITES' non-public use space (10,548 sf) primarily consists of offices and conference rooms. An additional 161 sf is used for temporary loan object storage. SITES does not anticipate any increase or decrease in support space in the near future.

Exhibition Activity

During Fiscal Years (FYs) 1999 and 2000, SITES opened 21 exhibitions. SITES co-organized 20 exhibitions. It also managed the exhibition of the Cooper-Hewitt's *Under the Sun: An Outdoor Exhibition of Light* in the Enid A. Haupt Garden on the National Mall.⁸⁴

The SITES document "How an exhibition is created" outlines the process from the Start-Up Meeting through the major planning steps. There are six planning components: administration, letter of agreement/memo of understanding, marketing, fundraising, content, and advertising materials/programming.

Size and Content of Exhibitions

FY99-00 exhibitions occupied 55,008 sf of space. Exhibitions averaged 2,619 sf. Not including *Under the Sun*, an outdoor installation, the largest exhibitions were *Star Wars: The Magic and the Myth* and *Hubble Space Telescope: New Views of the Universe, Version I*, each at 5,000 sf. The smallest was *Looping the Loop* at 567 sf.⁸⁵ Exhibitions displayed 1022 objects; 197 were (19%) from Smithsonian collections. On average, exhibitions displayed two objects per 100 sf.

Exhibition Costs

SITES' budget worksheet consists of eleven categories of expense: research and development pre-design, design and production, audiovisual, photographic services, publications production, special events/public relations, educational activities and materials, travel, transportation, exhibition tour maintenance, and insurance. The projected expense is recorded for each line item.

⁸⁴ Due to structural problems inherent in the exhibition components, installation costs that would be prohibitive for SITES' clients, and safety concerns expressed by Smithsonian Institution Risk Management, the exhibition did not continue to travel after its Washington, DC stop.

⁸⁵ Extrapolated from 165 linear feet in three rooms.

Exhibitions opening in FY99-00 cost \$7,189,865, out-of-pocket.⁸⁶ The most expensive exhibition per square foot was *Hubble Space Telescope: New Views of the Universe, Version I* (\$562.01 per sf). The least expensive exhibition per square foot was *Under the Sun* (\$8.17 per sf). The mean cost per square foot for the 21 exhibitions was \$109.67. Costs for exhibition-related staff, including salary and benefits, for FY99-00 was \$7,250,000.⁸⁷

Collaboration and Contracting

The OP&A questionnaire listed 36 exhibition-related services. On average, nine of the listed services were contracted for each SITES exhibition, three services were provided in-kind by an outside organization and/or individual, and seven services were provided by another Smithsonian unit.

For those exhibition-related services⁸⁸, SITES paid contractors \$5,181,242 and reimbursed Smithsonian units \$359,620. Other Smithsonian units also provided in-kind support estimated at a value of \$333,550. Outside organizations and/or individuals provided in-kind support estimated at \$2,076,200.

Exhibitions Staff

SITES has 55 full-time equivalent (FTE) staff, including 54.9 exhibition-related FTEs (100% of all FTEs). Total costs for these exhibition-related staff were \$3,625,000 in FY00. Training expenditures for exhibition-related staff in FY00 totaled \$4,510.

Staff working on exhibitions are distributed throughout the organization. The organization is hierarchical with four department directors and one deputy director reporting to the director of SITES. These department directors include: director of External Relations, director of Development, director of Exhibits, and director of the International Gallery. The deputy director of SITES oversees the director of Accounting and the director of Budget and Finance. The director of Exhibits oversees five team leaders who supervise numerous project directors and registrars.

SITES reported the time spent (in FTEs) during FY00 by exhibition-related staff on each of 25 activities listed by OP&A. SITES exhibitions staff work in five areas: management/administration, project management, registration/collections, writing/editing, marketing/public affairs, fundraising, and scheduling.

Exhibition Design and Production Capability

SITES has no design, graphic production, fabrication, or multimedia capabilities. However, SITES would like to have use of Smithsonian Institution-wide systems and equipment in general in all of the above categories.

⁸⁶ All expenditures discussed here include only exhibition-related costs and do not include: in-house staff, overhead costs, publications, brochures, public programs, and advertising.

⁸⁷ Extrapolated for FY00.

⁸⁸ Services included research, design, and production services.

Principal Strengths and Weaknesses

SITES reports that its three greatest strengths related to creating and presenting exhibitions are:

- Developing exhibitions that will be presented successfully by a wide variety of exhibitors. This includes assessing market interest about a topic; managing design for flexible, modular exhibitions; determining travel-worthiness of objects; supervising fabrication of durable and attractive components and arranging for crating and shipping; and maintaining contact with exhibitors to provide technical, programmatic, and public relations assistance;
- Planning projects that continue for an average of three to five years; forecasting expenses; working with exhibitors to plan events and programs; and producing, warehousing, and distributing publications and materials to exhibitors throughout the exhibition tour; and
- Collaborating with a wide array of colleagues (curators, registrars, collections managers, administrators, educators, as well as public relations, fundraising, and administrative staff) in all SI museums, divisions, and central offices to produce, publicize, and circulate exhibitions.

SITES reports that its three greatest weaknesses related to creating and presenting exhibitions are:

- Not having access to advance ('risk') funds which runs at odds with the Secretary's goals to produce exhibitions quickly;
- Limited access to SI collections despite positive collegial relationships – collections are fragile, conservation needs are great, and individual museums' priorities often compete with traveling exhibitions; and
- Lack of independent design/production capabilities and staging/storage areas – SITES relies entirely on outside contracts or on OEC, where services are subject to scheduling availability and all services are at a cost.

Smithsonian Tropical Research Institute

Background

The Smithsonian Tropical Research Institute (STRI) is dedicated to conducting long-term studies in tropical biology. Although the Smithsonian Institution was one of several organizations participating in the initial research and administration of Barro Colorado Island in Panama, this biological reserve became a unit of the Smithsonian in 1946. The organization officially changed its name to Smithsonian Tropical Research Institute in 1966. STRI is part of the Smithsonian Science division.

Facility

STRI has 13,558 acres in total assignable organization space; 13,551 acres are outdoor spaces and 7 acres (300,126 square feet) are indoor spaces. The main location (Tupper) has 90,524 square feet (sf) indoors and four acres outdoors, while other sites⁸⁹ have 209,602 sf indoors and 13,551 acres outdoors.

The indoor public-use area totals 74,797 sf at the main location, 10,412 sf at the Marine Exhibition Center on Culebra, 9,566 sf at the Visitor's Center on Barro Colorado, and 1,507 sf at Naos (96,282 sf in all). The outdoor public-use space totals four acres at the Marine Exhibition Center. Indoor space dedicated exclusively to exhibitions totals 1,086 sf at the Marine Exhibition Center and 2,740 sf at the Visitor's Center (3,826 sf in all). Mixed-use space is located indoors at the main location (1,767 sf), the Marine Exhibition Center (9,326 sf), and Naos (1,507 sf) and outdoors at the Marine Exhibition Center (four acres) and the Visitor's Center (5,745 sf). A possible 2,313 sf are available for indoor temporary exhibitions at the main location (1,227 sf) and the Marine Exhibition Center (1,086 sf). STRI does not anticipate any increase or decrease in public-use space in the near future.

STRI has 800 sf of non-public space designated for exhibition support. Most of the area is occupied by photography (500 sf). Exhibition design/detailing, graphics/art production, and conservation share 300 sf. STRI does not anticipate any increase or decrease in support space areas in the near future.

Exhibition Activity

During Fiscal Years (FYs) 1999 and 2000, STRI opened one exhibition, *Desaparecen los Amphibians (Vanishing Amphibians)*, originated by SITES.

Size and Content of Exhibitions

The exhibition occupied 1,200 sf of space at STRI and had no objects.

Exhibition Costs

The exhibition cost \$24,000 out-of-pocket.⁹⁰ The cost per square foot for the exhibition was \$20.00.

⁸⁹ Culebra, Barro Colorado, Gamboa, Ancon, Galeta, Bocas, and Naos.

⁹⁰ All expenditures discussed here include only exhibition-related costs and do not include: in-house staff, overhead costs, publications, brochures, public programs, and advertising.

Collaboration and Contracting

For the venue-only exhibition *Desaparecen los Amphibians*, one service, fabrication, was provided by another Smithsonian unit.

Exhibitions Staff

STRI has 274 full-time equivalent (FTE) staff, of which just 0.12 FTEs are exhibition-related. There were no expenses for the exhibition-related staff and there were no training expenditures for exhibition-related staff in FY00.

STRI reported the time spent (in FTEs) during FY00 by exhibitions-related staff on each of 25 activities listed by OP&A. STRI exhibitions staff work in three areas: management/administration, graphic design, and interpretation.

Exhibition Design and Production Capability

Over the past three years, STRI performed 60% of its exhibition design work in-house and 90% of that work was rendered on computers. In addition, 95% of its graphic design work was completed in-house, with 80% of it done on computers. During the past three years, STRI contracted detailers to prepare production drawings and did not provide design or graphic services to other Smithsonian Institution units.

Exhibition design and graphic design software used by STRI includes Adobe Photoshop and Adobe Illustrator. For design, STRI would like to have a plotter, slide scanner, digital camera, multi-media equipment, video camera, VCR, Macintosh G4, and a DVD player. In the area of graphic production, STRI currently has standard digital imaging capabilities (in use 100% of the year) and would like to have a digital camera, a DVD player, DVD player/writer and software, video software for editing and audio, Macromedia Director, and a CD burner.

STRI has one fabrication capability, wall construction, which it uses 25% of the year. It would like to have the following capabilities and equipment: Plexiglas, fine cabinetry, metal, glass, stonework, and electrical work, general structural production, unusual finishes, model-building, mannequins, mount-making, castings, matting/framing, plumbing, and painting.

STRI does not have an in-house audiovisual or multi-media production capability and has not created any computer interactives, but would like to have a DAT recorder, audio field mixer, 3D Studio Max, and a PC.

Principal Strengths and Weaknesses

STRI reports two great strengths related to creating and presenting exhibitions:

- Curators that have information to present to the general public, and
- Interpreters and graphic designers who have ideas for interpreting and presenting this information graphically in exciting ways.

STRI reports that its two greatest weaknesses related to creating and presenting exhibitions:

- Lack of equipment for graphic production, and
- Lack of at least one staff person assigned to exhibition project management.