

Visits to the Smithsonian: 1996 to 2006



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Preface

Smithsonian museum have been an iconic destination for visitors from all parts of the United States and foreign countries for generations. Our museums have attracted millions of tourists to Washington, DC, and New York as well as providing an educational and recreational destination for local residents. In the months following the terrorist attacks on September 11, 2001, the Smithsonian museums experienced sharp declines in the number of visits. While the attendance levels at many Smithsonian facilities have recovered to pre-9/11 levels, others have not.

This report was prepared in response to a request from the Smithsonian Institution Board of Regents. It examines visit patterns at Smithsonian museum facilities for the period from 1996 to 2001. It finds that attendance over this period has been affected by environmental factors outside the control of the Smithsonian such as overall consumer confidence in the U.S. economy and weather as well as factors under the control of museums such as special exhibitions.

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Visits to the Smithsonian: 1996 to 2007

Counting at the Smithsonian: Visitors or Visits

Two friends from New York may enter the Donald W. Reynolds Center to enjoy the Smithsonian American Art Museum and the National Portrait Gallery. A family with one grandmother, mother, father and three children, visiting Washington from the Middle West, may enter the National Air and Space Museum. A local school field trip with a teacher, an adult chaperone and 12 Kindergartners may enter the National Museum of Natural History to study mammals. Two adults enter the Arthur M. Sackler Gallery to see the new special exhibition, having enjoyed the previous special exhibition. A mother and child in a stroller enter the National Zoological Park on their weekly stroll to see the Giant Pandas on the Asian Trail exhibition.

These scenes are repeated millions of times each year in the 21 Smithsonian museum related facilities.¹

¹ The 21 museum related facilities are the National Air and Space Museum (Mall Building) (NASM), National Museum of Natural History (NMNH), National Museum of American History (NMAH), Smithsonian Institution Building or Castle (SIB), Freer Gallery of Art (FGA), Arthur M. Sackler Gallery (AMSG), National Museum of African Art (NMAfA), Hirshhorn Museum and Sculpture Garden (HMSG), Smithsonian American Art Museum (SAAM), National Portrait Gallery (NPG), Renwick Gallery (SAAM) (Renwick), Ripley Center (Ripley), National Museum of the American Indian (Mall Building) (NMAI), National Postal Museum (NPM), National Zoological Park (NZA), Anacostia Museum (AM), Cultural Resources Center (NMAI) (CRC), and Udvar-Hazy Center (NASM) (UHC) located in the Washington metropolitan area. The Cooper-Hewitt National Design Museum (CHNDM) and George G. Heye Center (NMAI) (GGHC) are located in New York City. In addition, the Arts and Industries Building (AIB) on the National Mall was open during the period covered by this study but closed in July, 2004. SAAM and NPG are both housed in the Donald W. Reynolds Center for American Art and Portraiture (DWRC). FGA and AMSG are combined as FSGA throughout most of the following analyses.

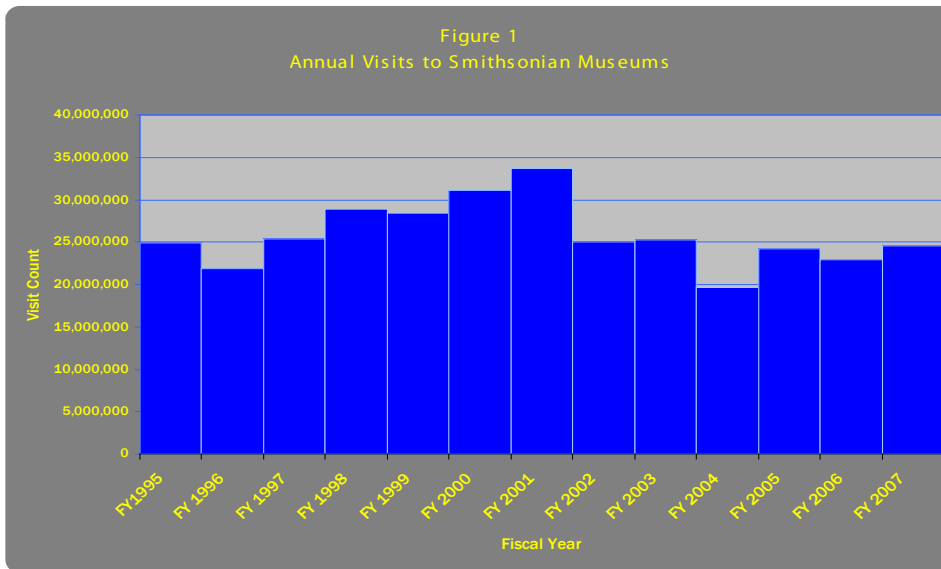
In the example, a total of 26 persons are visiting Smithsonian museums and the zoo. Each person is counted by a security officer as they exit the building and reported in the daily visitor count reported by the Office of Protection Services. Given this scenario several observations are in order. First, only visits are counted, not unique visitors. The couple at AMMSG were counted as two visits when they saw the previous exhibition as well as the one that they are currently visiting. The sum of daily visit counts is greater than the number of “visitors.” Second, in two unique instances, the reported visit count may not represent the number of persons who visited some museum facilities on a given day. For example, a visitor to DWRC may actually visit one or two museums but be counted as only one visit since SAAM and NPG are both housed in the Center. A visitor leaving AMMSG is counted as one visit to AMMSG, however, it is possible that a single visitor may have visited AMMSG, FGA, NMAfA and Ripley which are connected below ground, while only exiting one museum. And, third, other persons who are not visiting a museum facility such persons using rest rooms, persons exiting briefly and returning, and employees may be included in the visit counts.

Thus, the figures reported by the Smithsonian Office of Protection Services (OPS) represent visit counts, as OPS correctly entitles its reports, not the number of visitors. The number of visits will increase and decrease both as the number of visitors increases or decreases and as visitors visit more or fewer museums.

Historical Visit Patterns at the Smithsonian

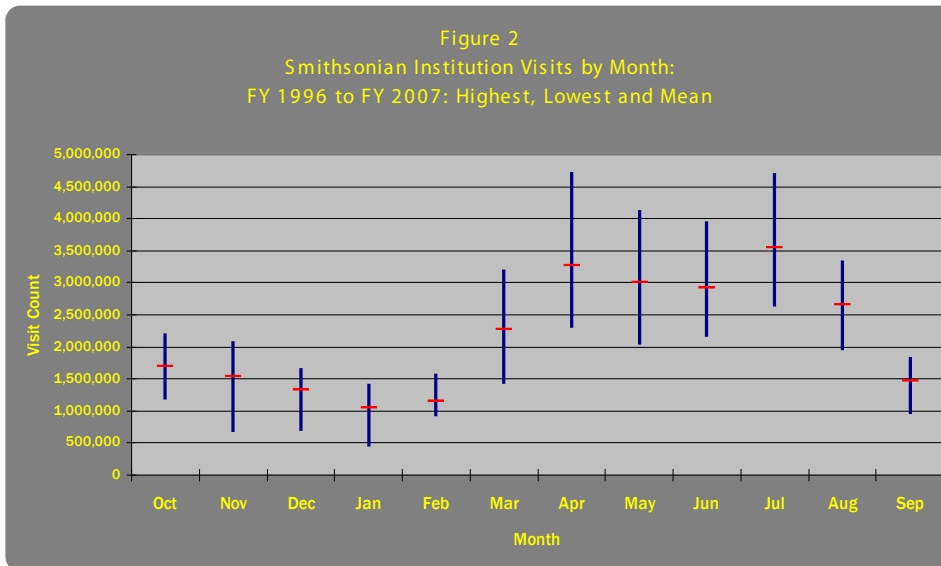
The annual total number of visits counted at the Smithsonian (see Figure 1) has ranged between a low of 19.6 million (FY 2004) and a high of 33.7 million (FY 2001) during the period from Fiscal Year 1996 to Fiscal Year 2007.² Generally, fewer visits have been counted at Smithsonian museum facilities in the six years since the events of September 11, 2001 than in the five before even though additional facilities have opened. An important characteristic of visits to the Smithsonian is that the number of visits varies greatly by month. Figure 2 shows the mean number of visits for each month as well as the range, from lowest to highest, during the eleven year period studied. July has had the highest mean number of visits (3.5 million) followed by April with 3.3 million. Conversely, January (1.0 million visits) and February (1.2 million visits) have had the lowest number of visits on average. As Figure 2 also shows, April has

² Annual visit statistics are reported for Fiscal Year in this report, i.e., FY 2006 covers October 2005 through September 2006.



the greatest variability, ranging from 2.3 million visits (2004) to 4.7 million visits (2001). Seasonal variability is an important and defining characteristic of Smithsonian museum attendance. Museums can be extremely crowded during the Spring Break period, but virtually empty during the winter, especially if winter is cold and snowy.

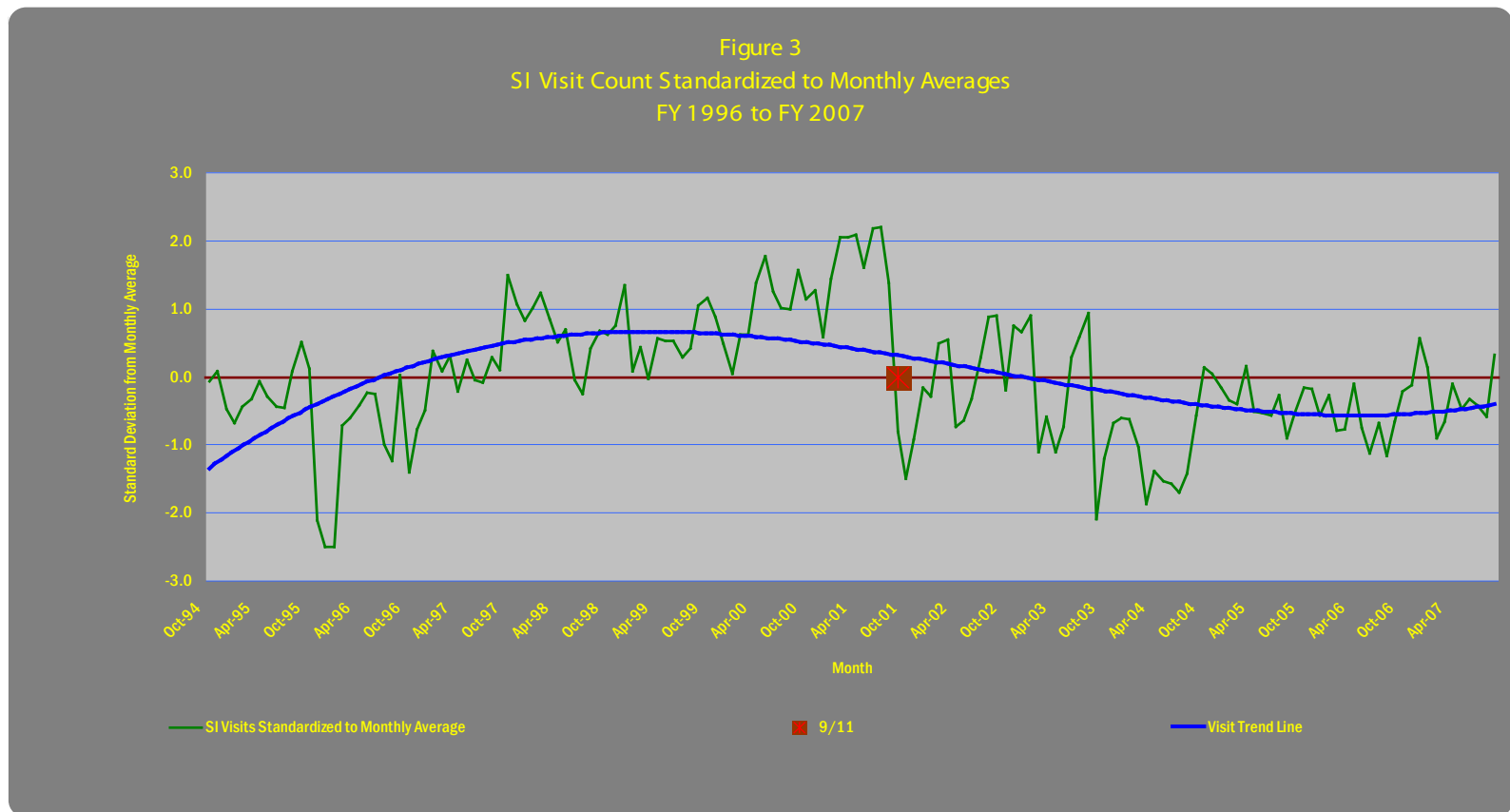
Smithsonian visits peaked at 33.7 million in FY 2001 and were lowest in FY 2004 at 19.7 million.



Seasonal variation is the first consideration in understanding visitation to Smithsonian museums. Given the range of variation in visits by month, an examination of visit counts for the entire study period beginning with October 1995 and ending with September 2007 may be misleading. If the visit count for January in a given year is 1,000 higher than the

mean January count, it is significantly greater, relative to the expected January visit count, than 1,000 over the mean for April.

Direct comparisons of which months have substantially higher, or lower, than expected visits require visit counts expressed as the number of standard deviations above or below the monthly mean.



The first step in looking at trends in Smithsonian visits between FY 1996 and FY 2006 is to standardize all observed counts to monthly means.

The adjusted visit counts for the eleven year period show wide variations in numbers; however, they also can be represented by a long-term curvy trend that rises in the early years, but decreases following the September 11 terrorist attacks (see Figure 3). Since the horizontal axis (0.0) is the line of projected visits based on the historic data, months with higher than projected visits are above the red line defining the axis. Thus, Figure 3 shows that the number of visits between mid-2000 and September 2001 was much higher than statistically expected. The period after September 11, 2001, has been marked by fewer visits than years between 1997 and 2001, although visits exceeded statistical expectations in some months. More recently, the overall Smithsonian visit count has begun to increase as new facilities have come on-line and attendance at some museums increased during 2007, although the overall visitation trend remains below the historical average.

Factors Affecting Museum Visitation

Smithsonian museums receive several streams of visitors: residents of the metropolitan Washington, DC, area (locals); tourists from other areas of the United States and other countries; and organized groups (school and tour groups). The number of visitors on a given day is a function of many factors that are outside the control of Smithsonian managers as well as some factors that are more within the control of museum managers such as exhibitions and special events. A sixty-degree day in January or February is believed to bring out more visitors, while a below zero day with a foot of snow is believed to create empty galleries, stores and restaurants.

After the visit counts were standardized to the historic monthly means, the next step is to compensate for the effects of uncontrollable environmental factors in computing a monthly visit figure for each museum for each month between October 1995 and September 2007. While there are many factors, for which data were available for each month between FY 1996 and FY 2006, five were considered in adjusting visitation levels for Smithsonian museum.³

3 One factor that may be very important was not used in the adjustment process: the number of tourists. The Smithsonian has

Figure 4

**Visit Count Variability Explained by Environmental Factors:
Standardized Monthly Visit Counts:
FY 1996 to FY 2007**

Museum	Explained by Environmental Factors
GGHC	51%
DWRC	51%
NMAH	42%
UHC	41%
NPM	29%
SIB (Castle)	26%
HMSG	25%
Renwick	24%
NMNH	20%
CHNDM	15%
NZP	9%
NMAfA	9%
FSGA	9%
NASM	9%

The five factors are:

- Consumer Sentiment Index - A survey of consumer confidence conducted by the University of Michigan and Reuters. It is used as a leading economic indicator that gives a snapshot of whether or not consumers feel like spending money. Two related components, the Current Conditions Index for the previous month and the average of the Future Expectations Index for the current and previous month, also were included in the regression analysis.
- Change in the Recreation Consumer Price Index compiled and reported by the U. S. Bureau of Labor Statistics.
- Change in the Travel Consumer Price Index.
- Total monthly precipitation for Washington, DC, and New York City as reported by the U. S. National Oceanographic and Atmospheric Administration.
- A dummy variable indicating month when the average temperature (Washington or New York Central Park) was exceptionally hot during summer months and cold during winter months.

These five environmental factors statistically “explain” much of the variability in visit counts across individual Smithsonian museums although the relative significance varies across museums.⁴ These five factors statistically accounted for half of the variability in visit counts at GGHC and DWRC and about two-fifths at NMAH and UHC. In contrast, the factors accounted for less than ten percent of the visit count variation at NZP, NMAfA,

traditionally not recorded the number of visits resulting from school and tour groups. In addition, we did not have information on the number of local visitors and tourists monthly for the 11 years. Museum shop transactions, for which residence is available in most cases, might have served as a surrogate for the local/tourist distinction; however, transaction data were not available for the entire period. There is no justification for believing that local and non local visitors are equally likely to shop, and the group distinction is totally absent. Several facilities for which visit counts are reported were excluded from subsequent analyses because their visit counts are low including CRC and AM.

4 In the underlying statistical analysis, all six factors were used as a group to “predict” monthly visit counts by museum in a linear regression equation. Regression coefficients are available from the Smithsonian Office of Policy & Analysis (OP&A). The percent of variability statistically explained is adjusted for degrees of freedom. This value is less than the unadjusted percent.

FSGA, and NASM. The percent of variation in visits explained at Smithsonian museums open during the study period and NZP are presented in Figure 4.

The most important single environmental factor across most Smithsonian museums is the level of consumer sentiment. That is, the more confident people feel about the economy and the more willing that they are to spend money, the greater the relative number of visits to the museums.⁵ Comfortable temperatures and precipitation are also significant external environmental factors across many museums.

Clearly, Figure 4 shows that much of the fluctuation in visit counts at Smithsonian museums is a result of changes in the environment. Even at museums as diverse as HMSG and NMNH, approximately a quarter of variation is correlated with the environmental factors. CHNDM appears to be one of the most insulated Smithsonian museum, perhaps because it hosts fewer school and other tour groups.

Museum Attendance is affected by special exhibitions as well as consumer confidence and weather.

Exhibitions and Visit Counts

Controlling for both seasonal and environmental effects provides historic patterns of expected visit counts that more accurately reflect variations in Smithsonian museum visitation. Major exhibitions such as *Star Wars: The Magic of Myth* at NASM, *Hokusai* at FSGA, *Vikings* at NMNH, *The American Presidency: A Glorious Burden* at NMAH, *Dali's Optical Illusions* at HMSG, a Giant Panda cub at NZP, and *Design Life Now: National Design Triennial 2006* at CHNDM swell audiences with resulting higher visit counts than expected for a given month.

The number of visitors at Smithsonian museums increases when special exhibitions open. On the other hand, some Smithsonian museums regularly list opening exhibitions in the *Torch* regardless of size, content or promotion as they involve collections on public exhibition. Thus, the current analysis is crude in treating all new exhibitions as equal; it must not be considered causal, but rather correlational. Opening an exhibition should not cause the number of visitors to drop. When a museum has many small, unpromoted exhibitions listed or very few new

⁵ NZP, FSGA and CHNDM are three museums for which Consumer Sentiment is not a statistically significant predictor of visit counts.

exhibitions listed, simply correlating exhibition openings with visit counts may result in negative correlations.

On average, opening an exhibition was associated with increases in visits at the following museums in a typical June:

- NMNH 103,000 visit increase
- NMAH 22,000 visit increase
- AMMSG 4,700 visit increase
- CHNDM 2,800 visit increase
- GGHC 2,200 visit increase
- HMSG 1,500 visit increase
- RG 180 visit increase
- NPM 80 visit increase

Visit surges may extend for more than one month and some museums may experience an increase in visits due to a new exhibition in another museum. Several museums (FGA⁶, NASM and NMAfA) had new exhibitions negatively correlated with changes in visit counts, although both NASM and NMAfA have mounted exhibitions that attracted significant audiences.

Figures 5 through 12 show the historic patterns of visits at six Smithsonian museums and the Castle and the trend line for Fiscal Years 1996 to 2007. These graphs also show months in which the six museums opened special exhibitions or new permanent exhibitions.⁷

6 AMMSG and FGA are physically connected and administered as one unit. AMMSG hosts traveling exhibitions, or exhibitions of borrowed artifacts, that frequently attract large audiences. FGA only exhibits artifacts from its own collections. Visit counts are the combined totals for both the AMMSG and FGA exits. The correlation analysis separated exhibitions at AMMSG (significant increases in visit counts) from exhibitions at FGA (not correlated with increases in visit counts).

7 All exhibitions listed in the *Torch*, published by the Smithsonian Office of Public Affairs, as opening during the coming month were entered into the analysis database. Exhibitions scheduled to open on or after the 20th of the month were assigned to the following month. Changes in the number of hours that museums are open for visitation may also affect the number of visits. The

Figure 5
 NASM Visit Trend and Variation After Removing Environmental Factors:
 FY96 to FY07

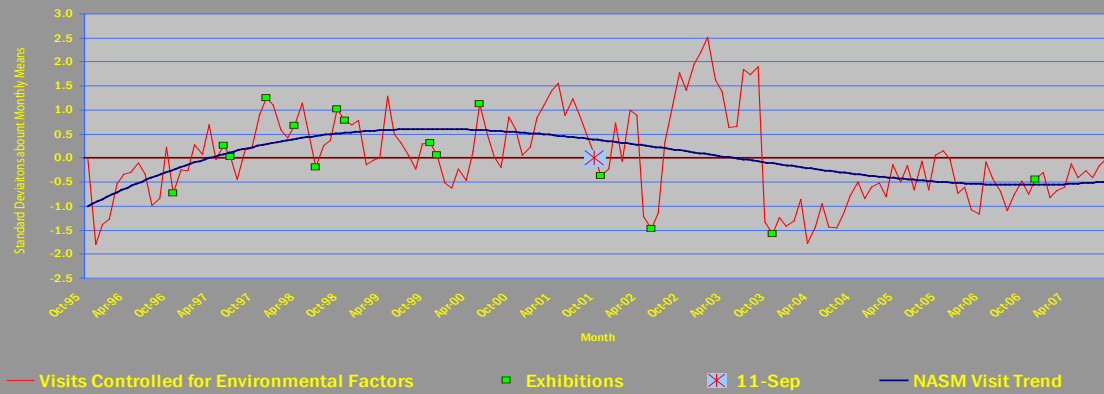


Figure 6
 NMNH Visit Trend and Variation After Removing Environmental Factors:
 FY96 to FY07

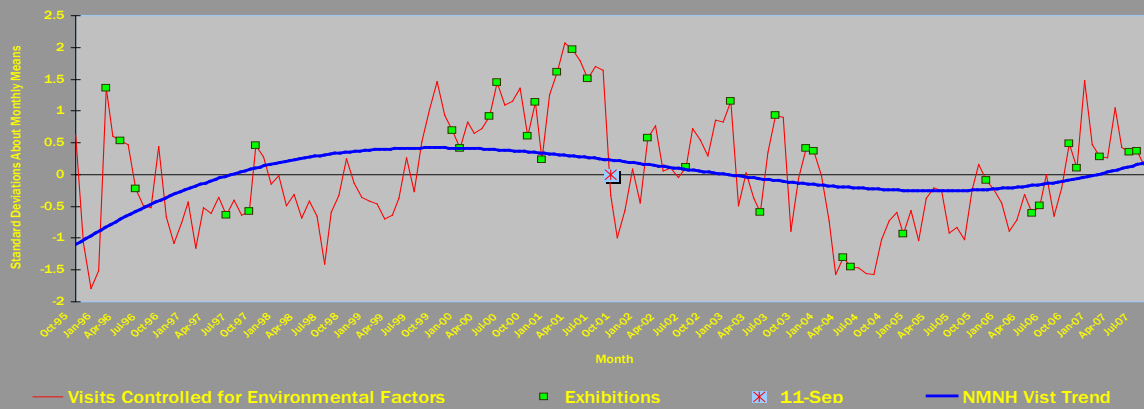


Figure 7
 NMAH Visit Trend and Variation After Removing Environmental Factors:
 FY96 to FY06

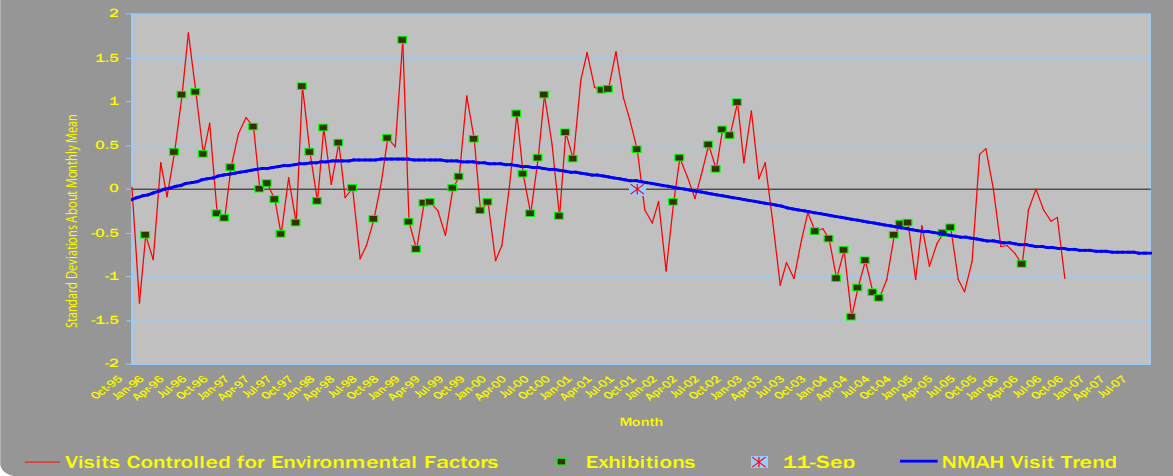
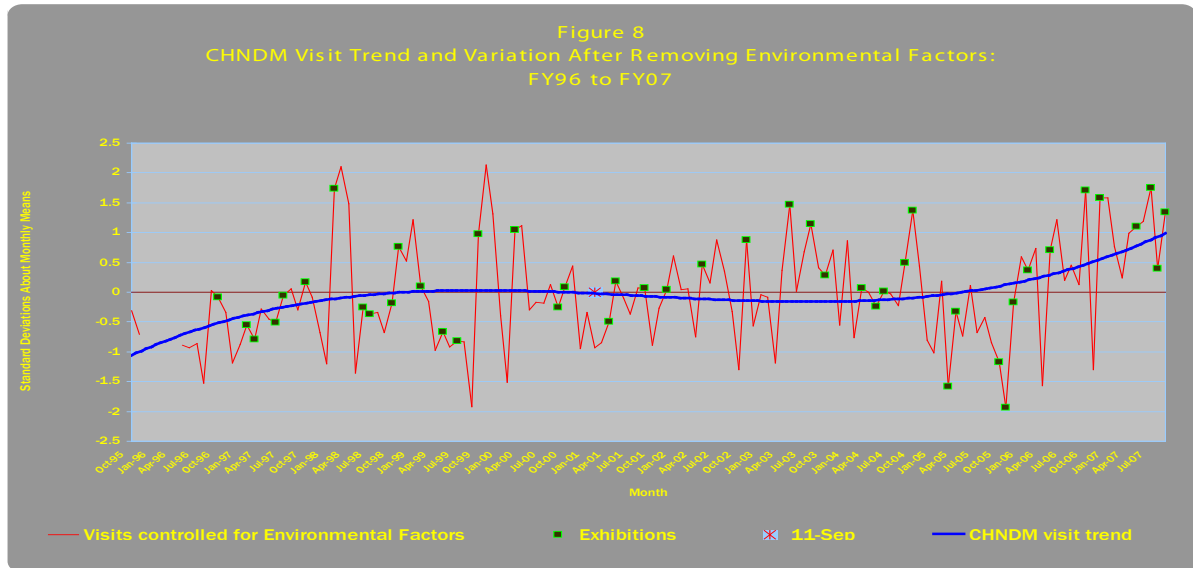


Figure 8
 CHNDM Visit Trend and Variation After Removing Environmental Factors:
 FY96 to FY07



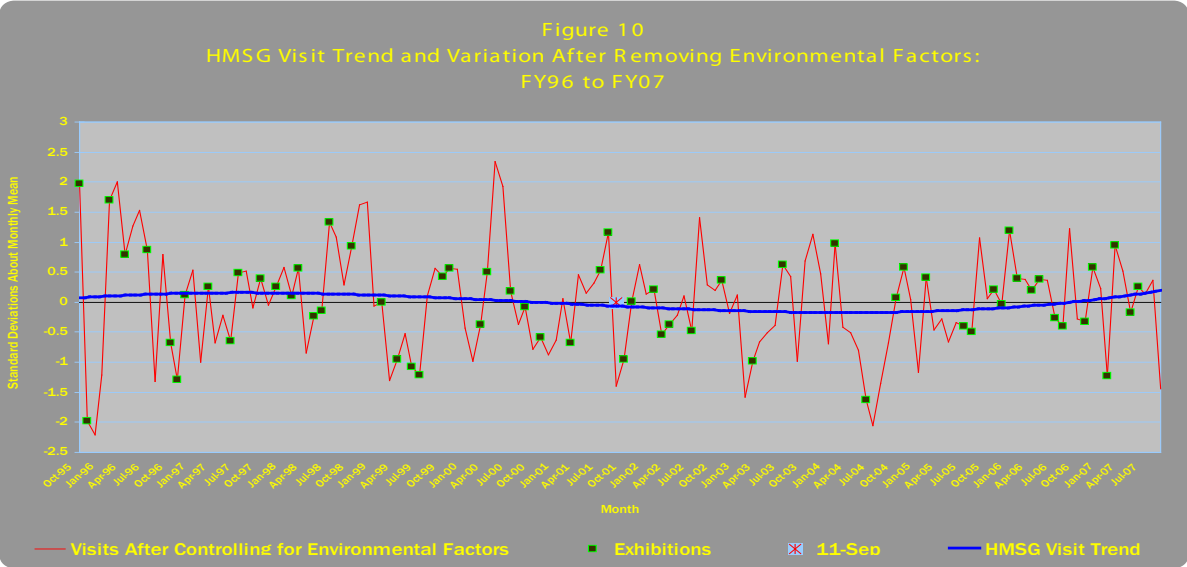
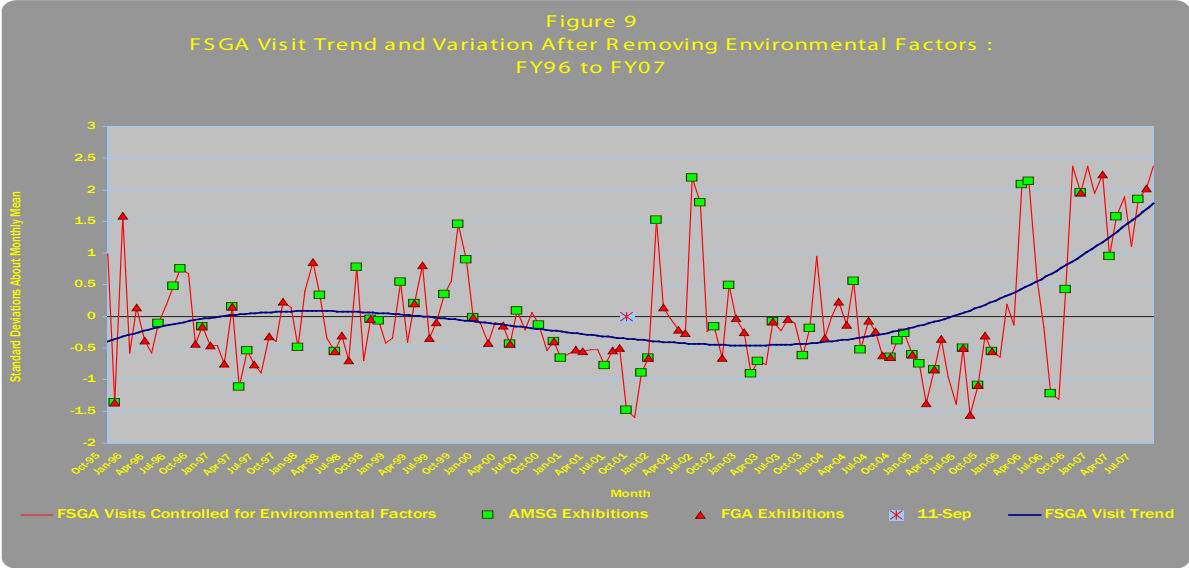


Figure 11
 NMAfA Visit Trends and Variation After Removing Environmental Factors
 FY96 to FY07

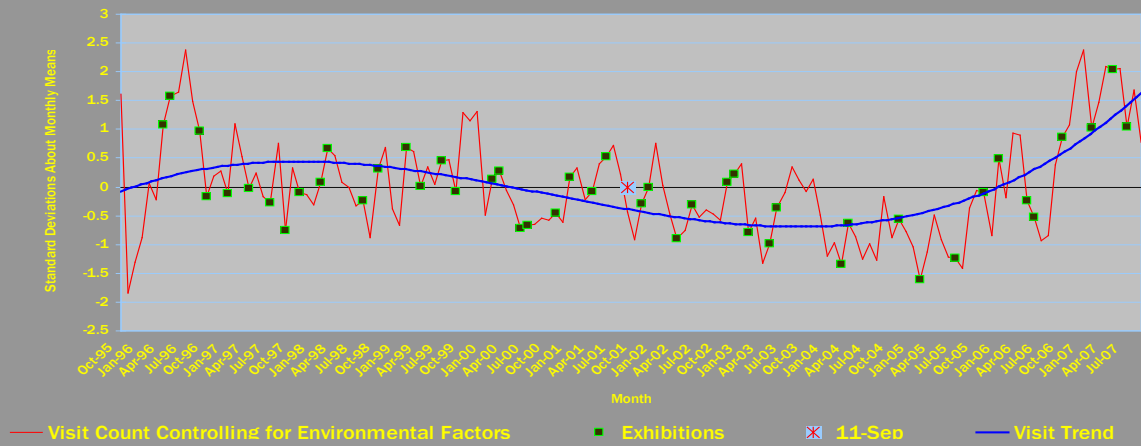
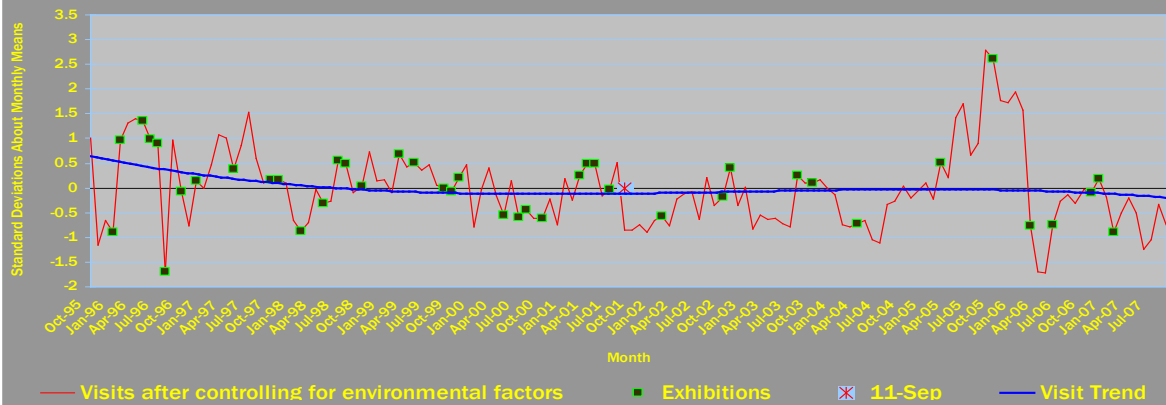
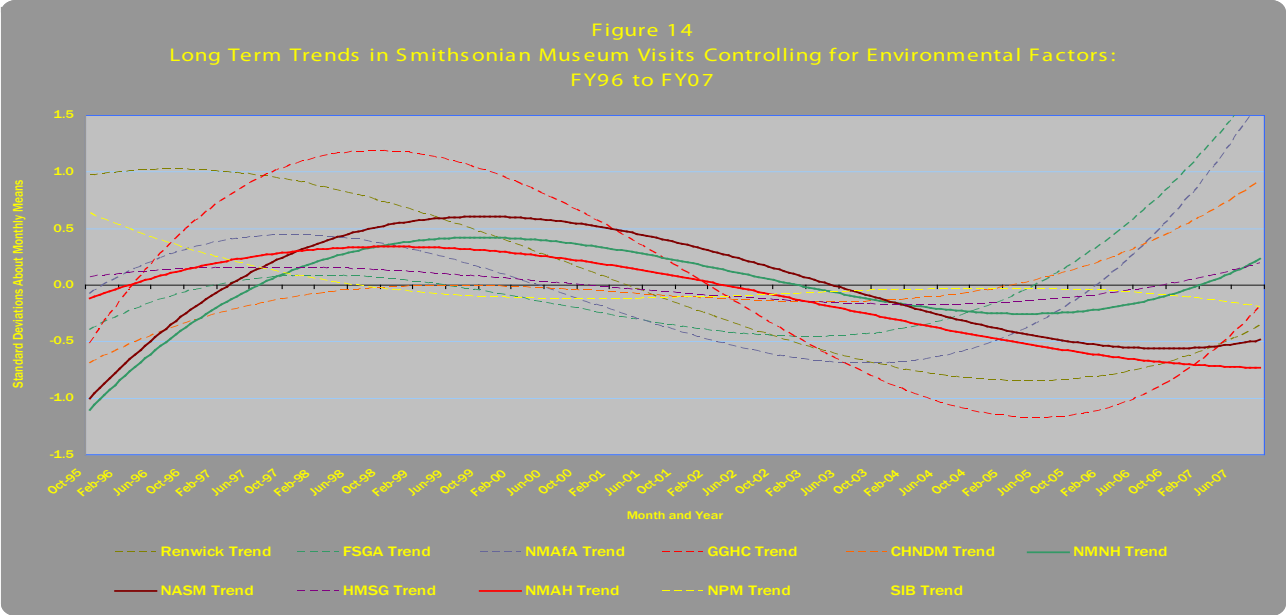
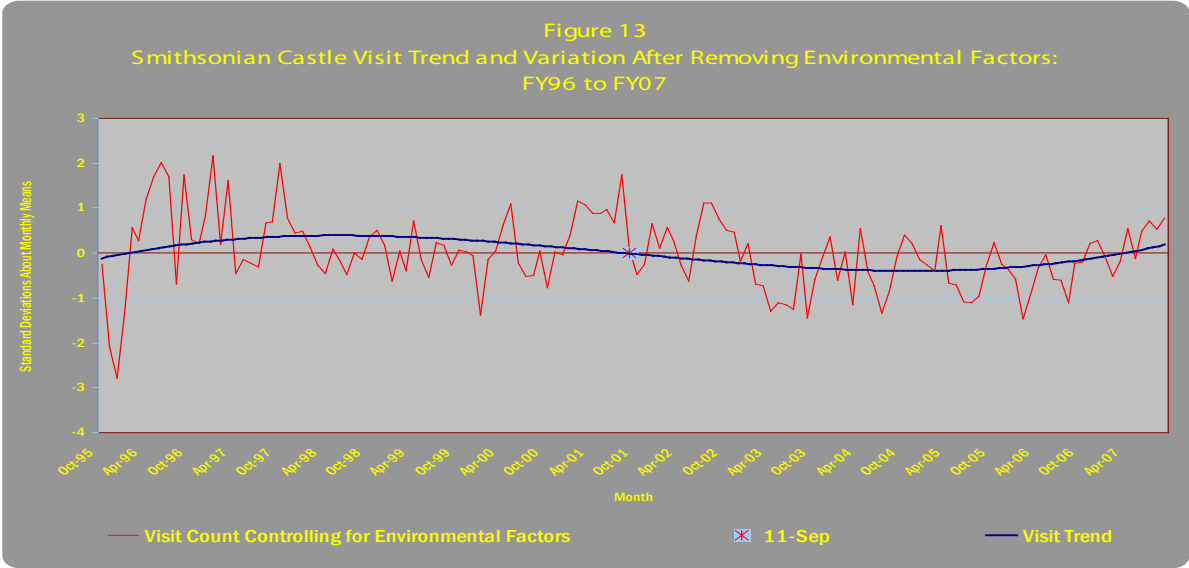


Figure 12
 NPM Visit Trends and Variation After Removing Environmental Factors
 FY96 to FY07





Superimposing all of the Smithsonian museum visit trends on one graph (Figure 14) shows that the trend was upward during the late nineties and the very early 2000's. The trend moved downward following the terrorist attacks on September 11, 2001. Most recently, almost all Smithsonian facilities with the exception of NPM have reversed the trend and are again moving upward.⁸ NASM appears to have begun recovering during 2007. Most Smithsonian art museums have regained pre-9/11 visit levels.

Washington Tourism and Visits to the National Mall

Visits To most Smithsonian museums have remained proportional to DC tourism except at the "Big Three."

More than three-quarters of Smithsonian museum visitors are either domestic or international tourists. About half are visiting the Smithsonian for the first time. The vast majority is visiting with other persons, children or adults, although the art museums see a larger share of unaccompanied visitors. On average, a typical visitor to the Mall museums will visit two or three museums during his or her visit.

The Washington DC Convention and Tourism Corporation has estimated the number of leisure tourists visiting Washington since 1998. These tourists are defined as persons who live more than 50 miles from Washington, either domestic or international. As with the Smithsonian visit counts, this figure is the number of visits and the actual number of visitors may be less. In 1998, 14.2 million visits were made. The number bottomed out at 12.5 million visits in 2002, and has increased since then to 14.1 million in 2006.⁹

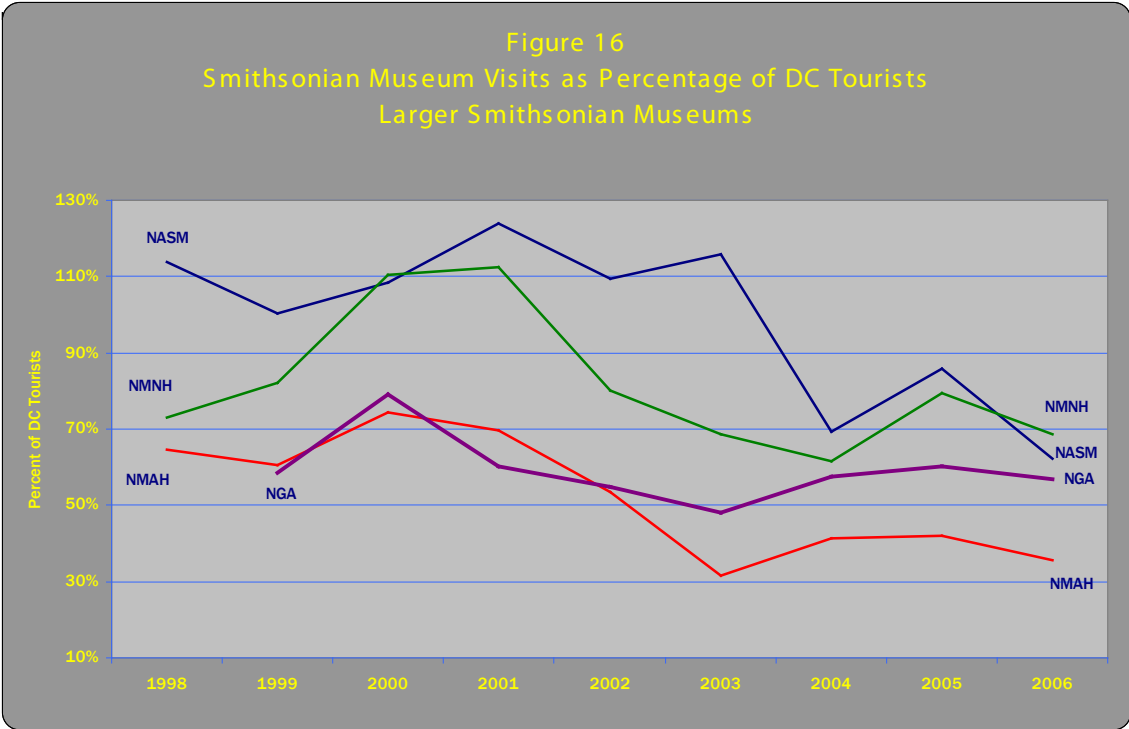
While not every Smithsonian visitor is a tourist within the Convention and Tourism Corporation's definition—one-fourth live in the metro area and many are local school students—the number of leisure visits is an interesting base for comparing Smithsonian visits over the eight year period.

number of hours open was not included in the present analysis.

8 If NASM's visit count during FY 2003 were reduced by about one-quarter and the count for FY 2004 were increased somewhat, NASM's trend would be more similar to other museums on the National Mall. Such an adjustment would also increase the correlation between the number of store transactions and the visit counts.

9 2005 is the last year for which this information was available.

If visits to the museums changed by exactly the same percentage as DC tourism changed from year to year, the ratio of museum visits to DC tourist visits would be a constant with large museums having a larger ratio than less visited museums. An increase in the ratio indicates that museums are increasing their visit counts more rapidly than tourism is changing. A decrease indicates that museum visit counts are shrinking relative to tourism, i.e., this is an indicator that museums are losing market share in some sense.



In the first few years (1998 to 2003), the ratio of NASM visits to DC leisure tourist visits remained essentially constant at roughly 110 percent, followed by a drastic plunge to 70 percent in 2004. The ratio rebounded slightly in 2005. (See Figure 16). That is, NASM visits increased or decreased at the same rate as tourism until 2004, when visits to NASM plunged relative to tourism.

In contrast, the ratios of visits to the other two of the “Big Three” relative to DC leisure tourist visits exhibit very different patterns—but similar to each other. The ratio of museum visits to tourist visits increased between 1998

and 2000 although NMNH visits increased more rapidly so that it exceeded NASM's visit count in 2000. Beginning with 2001, the ratios for both museums began to drop, and continued to drop through 2003 (NMAH) or 2004 (NMNH). NMAH's visit ratio stabilized from 2003 until it closed for renovation in September 2006. NMNH, on the other hand, rebounded slightly in 2005.

By themselves, the graphs of "Big Three" visits are interesting, but they become more significant when they are compared with the pattern of visits to the other large museum on the National Mall, the National Gallery of Art (NGA). NGA's pattern parallels the patterns of the Castle and Smithsonian art museums such as HMSG. That is, market share has remained constant, or declined slightly, between 1998 and 2005, except for a one year surge in 1999.¹⁰

On the whole, visits to other Smithsonian museums in Washington displayed a more stationary relationship between DC tourism and museum visits.¹¹

Thus, visits to the large Smithsonian museums reflected a pattern of decreased market share beginning in 2001¹²

10 The NGA visit counts were obtained from Smithsonian sources after several requests through the NGA Media Office were not answered.

11 NZP visit counts are first reported by OPS in 2001. NZP's pattern also declines through 2004 and rebounds slightly in 2005.

12 If NASM visit counts were reduced for FY 2002 and increased for 2004 to more closely correlate with store transactions, NASM's tourism ratio would decline steadily but more gradually, beginning in 2002, a year after NMNH and NMAH.

Figure 17
 Smithsonian Museum Visits as Percentage of DC Tourists
 Mid-sized Smithsonian Museums

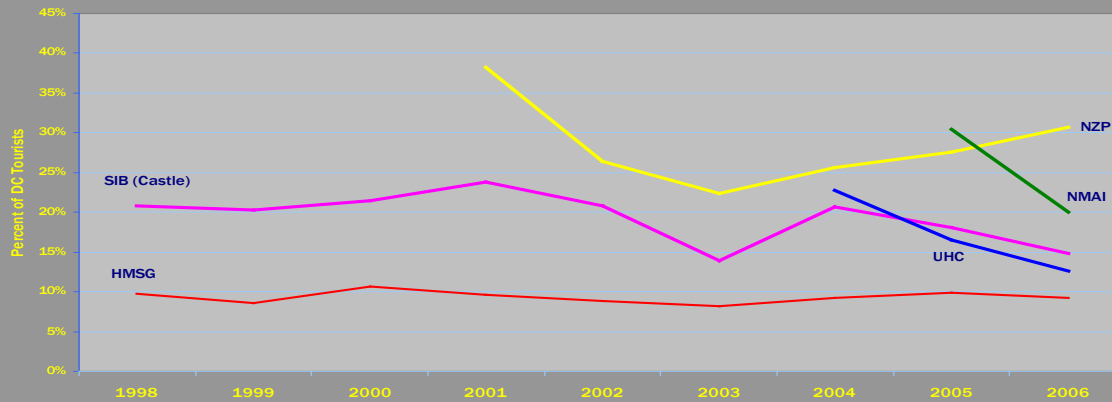
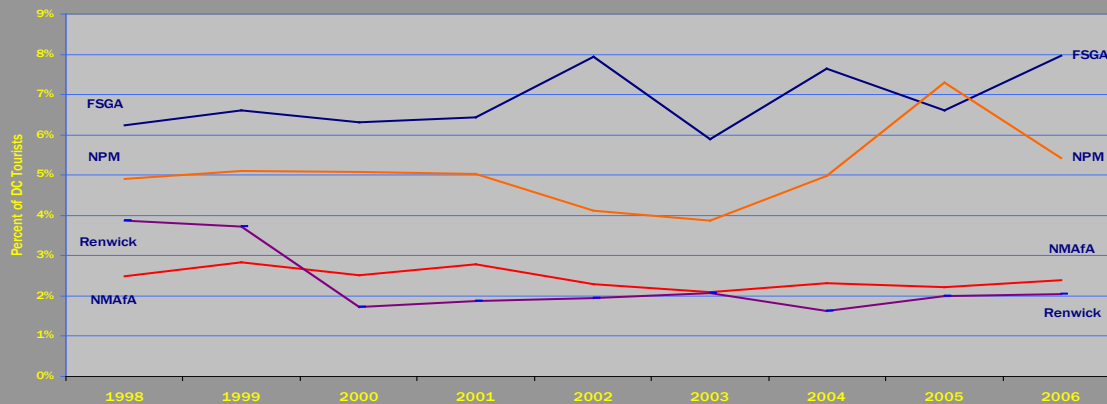


Figure 18
 Smithsonian Museum Visits as Percentage of DC Tourists
 Smaller Smithsonian Museums



preceding effects of 9/11 on tourism and museum visitation.¹³

While we do not have adequate data to test hypotheses of why the “Big Three” had such a radical change in their ratio of visits to DC tourists, however, there are several factors¹⁴ that might have produced this pattern:

- Popular exhibitions at NMNH and NMAH prior to 2001 drew more visits
- Time spent in the new IMAX Theater at NMNH (opened fall 1999) reduced the number of museums that visitors visited
- Tourists visited two rather than three of the “Big Three” after bag searches were introduced following 9/11
- A smaller percentage of tourists visited NMNH and NMAH beginning in 2001 than before
- Fewer visitors in organized groups (schools and tour groups) visited beginning in 2001.

Smithsonian visitation has largely Recovered from the precipitous decline following the terrorist attacks on September 11, 2001, however, the brand can be strengthened.

Conclusions

A survey of Smithsonian museum visit patterns over the past eleven years suggests several conclusions.

First, visits to Smithsonian museums have described a curvilinear trend historically, rising for a few years and then falling for a few years before rising again. The reported visit counts in recent fiscal years have been near historic lows at the “Big Three” museums. At the same time, most Smithsonian art museums are operating at, or above, historic averages. The overall count of visits to the Smithsonian reflects the confluence of these two trends as well as the effects of new facilities (NMAI Mall and UHC) and the reopening of DWRC. FY 2007 visits reflect the closing of NMAH. Reporting changes in visit counts for museums that have been open for more than one year, similar to the practices of retail and food service stores, would eliminate the distortions produced by openings and closings.

13 The heaviest visitation to Smithsonian museums occurs between March and August in a typical year. The tourist data are for calendar years, and the Smithsonian visit counts in Figures 16 through 18 also represent calendar year data.

14 One factor that apparently has not affected visitation is a change in the average number of days spent by leisure tourists during this period. According to the Tourism Corporation, the average number of days increased insignificantly from 3.1 in 2000 to 3.2 in 2005.

Second, factors outside the control of Smithsonian museums have a significant impact on visits. Visit counts vary greatly by month with spring and summer accounting for more museum visits than fall and winter. Although the percentage varied greatly across museums, simple environmental factors such as the level of consumer confidence in the economy and weather are statistically significant correlates of Smithsonian visits. In some cases, environmental factors “explained” half of visit variation. Other factors outside the control of Smithsonian museums include the opening of competitive facilities (e.g., International Spy Museum in 2000) and changes in consumer behavior (e.g., shorter vacations).

Smithsonian museums can increase the number of visits by mounting and promoting significant special exhibitions. Smithsonian art museums show a strong connection between major special exhibitions and higher than statistically expected visitation. Although regular rotation of collections, such as at FGA, and some special exhibitions were not associated with higher visitation, we cannot exclude the hypothesis that even these bring in visitors that would be lost with unchanged exhibitions. Even the “Big Three” have experienced higher than expected visitation when there were major special exhibitions or new permanent exhibitions. It is possible that the correlation between exhibitions and visitation could be more pronounced if the exhibitions included in the analysis were limited to *major* exhibitions rather than all exhibitions listed in the *Torch*. It is also possible that the effects of special exhibitions extend across museums. For example, anecdotally, store sales at HMSG shot upward while *Star Wars: The Magic of Myth* suggesting that visitors attracted by the special exhibition at NASM also visited HMSG.

As new museum facilities have opened or reopened or mounted attractive special exhibitions, Smithsonian visitation has become less dominated by the “Big Three.” Between FY 1991 and FY 2003, visits to NASM, NMNH and NMAH accounted for an average of 77 percent of all reported Smithsonian visits. Their share was 60 percent in the following three years—even before NMAH closed for renovation.

Fiscal Years 2000 and 2001 saw record numbers of visits to Smithsonian museums. The terrorist attacks on September 11, 2001, had a dramatic effect on visitation in the months following. While there may have been some undocumented effects on museum visitation, 9/11 does not appear to have had a long-term effect on Smithsonian

visits. Reported visitation had begun to decline, relative to Washington tourism, prior to the 9/11 attacks. Most Smithsonian museum have recovered sufficiently so that FY 2006 visitation was at or above historic expectations.

The relationship between Washington tourism and “Big Three” visits has changed dramatically in recent years—although the relationship with visits to smaller facilities has remained relatively stable. The nature of the change suggests that there has been a change in the value of the Smithsonian brand. Fewer visits are being made, whether by tourists, local visitors, or school groups, than previously. The present analysis cannot tell whether the fall-off has been uniform across audiences, whether some visitors have shifted from the “Big Three” to smaller museums, whether visitors have cut the number of large museums visited, or whether fewer visitors are visiting Smithsonian museums. The current analysis did not attempt to assess the effect of UHC on NASM Mall visits.

Finally, the current process of recording visits probably results in occasional inaccuracies. There are periods during which visit counts in one museum or another have dramatically increased or decreased very differently from other Smithsonian museums, apparently without other factors such as weather, consumer confidence or exhibitions. As noted earlier, the reported number of NMAfA, FGA, AMSG and Ripley visits understates the number of visits to those four facilities since one person could visit as many as four of the facilities, but be counted as only one visit.

