NSB-05-12

Report to the National Science Board

on the

National Science Foundation's

Merit Review Process

Fiscal Year 2004

March 2005

FY 2004 Report on the NSF Merit Review System

Summary

The National Science Foundation received more than 43,000 new proposals for funding between October 1, 2003 and September 30, 2004. The Foundation awarded about one quarter of the proposals received, making the decisions through the process of merit review. The merit review process includes the steps listed below and depicted in the diagram on the following page:

•The proposal arrives electronically, and NSF staff see that it is placed with the appropriate program(s) for review.

•The program officer (or team of program officers) reviews the proposal and assigns it to at least three experts from outside the Foundation (review generally takes place by mail, advisory panel, or combination of mail and advisory panel). Reviewers and panelists use two general criteria: intellectual merit and broader impacts. The Division leadership (Division Directors, Deputy Division Directors, and/or Section Heads) oversees the review process throughout its various stages. The program officer or team:

•selects reviewers and panel members, based on program officer's knowledge, references listed in proposal, recent publications in science and engineering journals, presentations at professional meetings, reviewer recommendations, bibliographic and citation databases, and proposal author's suggestions.

•receives the recommendation of the reviewers/panel, based on merit review criteria and other factors such as risk, balance of priorities, and budget constraints.

•The program officer makes a recommendation to award or decline the proposal, taking into account external reviews, panel discussion, and other factors such as portfolio balance and amount of funding available.

•A higher-level official (usually a Division Director, Deputy Division Director, or Section Head) conducts a programmatic review of all program officer recommendations. For award recommendations, a grants officer in the Office of Budget, Finance, and Award Management performs an administrative review. Recommendations for large awards receive additional review by higher-level organizations such as the Director's Review Board and the National Science Board.

•The Division leadership performs an annual qualitative assessment of the program portfolio.

•An external Committee of Visitors (scientists, engineers, and educators) assesses each program every 3-5 years, examining the integrity and efficiency of merit review processes and the quality of results from the Foundation's programmatic investments.

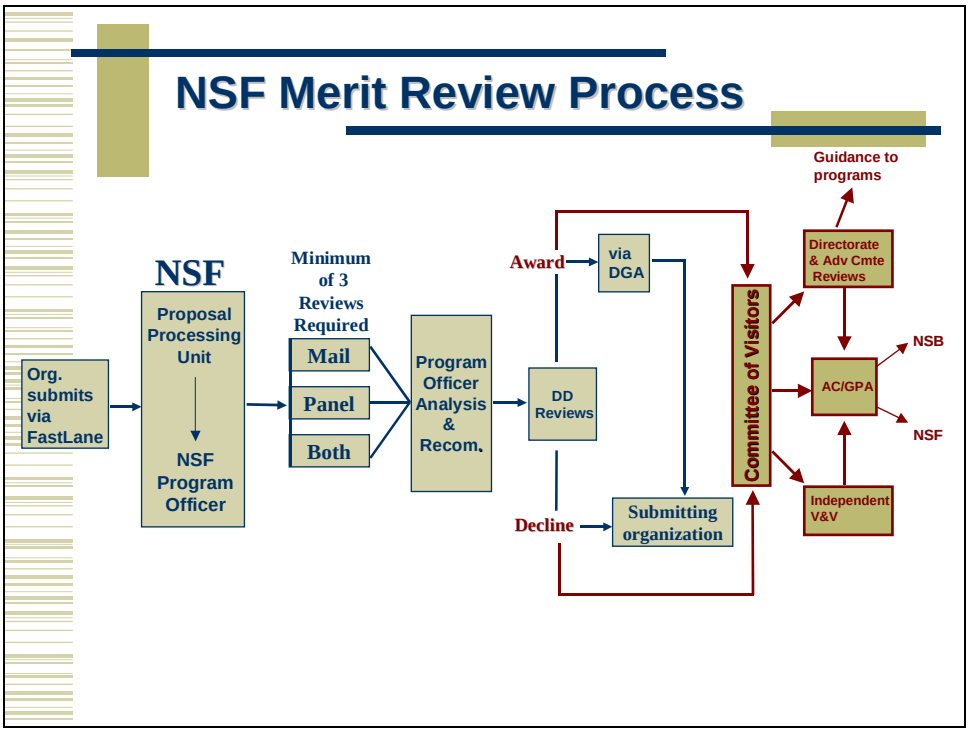
•Advisory Committees (scientists, engineers, educators) review Committee of Visitor reports and directorate/office responses and provide guidance to the Foundation's directorates and offices regarding the reports and other matters pertaining to past investments and future research and education activities.

•The Advisory Committee for Government Performance and Results Act (GPRA) Performance Assessment, a single committee of external experts convened yearly to assess results, evaluates the Foundation's portfolios and their linkages to strategic outcome goals. The Advisory Committee for GPRA Performance Assessment uses Committee of Visitor reports, internal and external directorate assessments of particular programs, investigator project reports, and directorate/division collections of outstanding accomplishments from awards in order to perform the evaluation.

•An external contractor performs an independent verification and validation of Foundation performance measurement.

•The National Science Board's Audit and Oversight Committee reviews the findings presented by the Advisory Committee for GPRA Performance Assessment.

The FY 2004 Report on the NSF Merit Review System provides summary information about the levels of proposal and award activity for the fiscal year 2004 (October 1, 2003 – September 30, 2004) and the process by which proposals are reviewed and awarded. A brief list of highlights is provided, followed by an introduction and information on numbers of proposals and awards, award sizes, and principal investigator and awardee institution characteristics. The next section details the steps in the merit review process, and the final section outlines government performance issues related to merit review and provides information on special types of proposal and grant mechanisms. Appendices include more detailed or illustrative material. This annual report to the National Science Board is required by NSB policy, and has been provided annually since 1977.



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HIGHLIGHTS

1. NSF took action on 43,851 competitively reviewed proposals, and provided funding to 10,380 of them during FY 2004. This resulted in an overall funding rate of 24 percent. The number of proposals reviewed increased by 9 percent over FY 2003 and 25 percent over FY 2002.

2. The average annualized award amount for research grants in FY 2004 was $139,522, an increase of 3 percent above the previous year and 22 percent above FY 2002. Adequate award size is important for attracting high quality proposals and for ensuring that proposed work can be accomplished as planned. However, increasing award size inevitably affects the funding rate (see Item 1, above). The FY 2004 funding rate was the lowest in 15 years.

3. The average award duration for FY 2004 research grants was 2.96 years. NSF's goal was to achieve 3.0 years. Again, increasing award size has implications for success rates.

4. In FY 2004, 77 percent of all proposals were processed within six months, the same proportion reported in FY 2003. Once again, the agency exceeded its Government Performance and Results Act (GPRA) target goal of 70 percent. The achievement of this goal is significant in light of the fact there was a major increase in the number of proposals submitted in the last two fiscal years (see Item 1, above).

5. In FY 2004, over 96 percent of NSF's research and education awards were selected through the competitive merit-review process.

6. Effective October 1, 2002, NSF returned without review proposals that failed to address separately both merit review criteria within the Project Summary. In FY 2004, NSF returned a total of 236 proposals without review due to the failure to address both merit review criteria.

7. During FY 2004, 92 percent of all external reviews addressed aspects of both merit review criteria -- intellectual merit and broader impacts -- compared to 90 percent in FY 2003 and 84 percent in FY 2002.

8. NSF made 382 small grants for exploratory research (SGER) awards in FY 2004 for a total of $29.5 million, compared to 344 SGER awards made last year for a total of $23.4 million. The average size of the FY 2004 SGER award was $77,000, compared to $68,000 in FY 2003.

9. In FY 2004, the number of proposals received by minority Principal Investigators (PIs) increased by 19 percent over the previous fiscal year. The funding rate for minority PIs was 23 percent, one percentage point lower than the overall rate. During FY 2004, the number of proposals received from women PIs increased by 15 percent. The funding rate for women PIs was 25 percent, one percentage point higher than the overall rate of 24 percent.

10. A large number of potentially fundable proposals are declined each year. In FY 2004, close to $2.1 billion of declined proposals were rated as high as the average rating for an NSF award (4.2 on a 5-point scale). These declined proposals represent a rich portfolio of unfunded research and education opportunities.

FY 2004 Report on the NSF Merit Review System

1. Introduction

The National Science Foundation (NSF) is responsible for advancing the progress of science and engineering in the United States across a broad and expanding frontier. It carries out its mission primarily by making merit-based grants to researchers, educators, and students at more than 2,000 U.S. colleges, universities and other institutions.

NSF supports fundamental research, education and infrastructure at colleges, universities, and other institutions throughout the country. Its broad support for research and education, particularly at U.S. academic institutions, provides funds for discovery in many fields and for developing the next generation of scientists and engineers.

NSF leads Federal agencies in funding research and education activities based upon merit review. This year NSF made more than 10,000 new awards from more than 40,000 competitive proposals submitted. Over 96 percent of NSF's research and education awards are selected through its competitive merit review process. All proposals for research and education projects are evaluated using two criteria: the *intellectual merit* of the proposed activity and its *broader impacts*, such as impacts on teaching and learning. Reviewers also consider how well the proposed activity fosters the integration of research and education and broadens opportunities to include a diversity of participants, particularly from underrepresented groups. The merit review system is at the very heart of NSF's selection of the projects through which its mission is achieved. Ensuring a credible, efficient system requires constant attention and openness to change.

This *FY 2004 Report on the NSF Merit Review System* responds to a National Science Board (NSB) policy endorsed in 1977 and amended in 1984, requesting that the NSF Director submit an annual report on the NSF proposal review system. The report provides summary information about levels of proposal and award activity and the process by which proposals are reviewed and awarded. While the report indicates several areas in which improvements are being made, the health and vitality of NSF's merit review process and the science and engineering community's confidence in the process remain strong.

2. Proposals and Awards

Competitively Reviewed Proposals, Awards and Funding Rates

During FY 2004, NSF took action on 43,851 competitive, merit reviewed research and education proposals, as shown in **Text Figure 1**, page 7. This represents an increase of 9 percent from the previous year and a 25 percent increase over FY 2002.

During FY 2004, NSF made 10,380 awards, slightly fewer awards than in the previous fiscal year. This resulted in an overall funding rate of 24 percent. As shown in **Appendix Table 1,** page 29, there are differences in the funding rates of the various NSF directorates,[1] ranging from 16 percent for Computer & Information Science & Engineering (CISE) to 33 percent for Geosciences (GEO). The variation may be due to factors such as the relative size and nature of the disciplines and communities being served.

Text Figure 1
NSF Proposal, Award and Funding Rate Trends

	Fiscal Year				
	2000	**2001**	**2002**	**2003**	**2004**
Proposals	29,508	31,942	35,165	40,075	43,851
Awards	9,850	9,925	10,406	10,844	10,380
Funding Rate	33%	31%	30%	27%	24%

Types of Proposals and Awards

In general, NSF makes two kinds of competitive grants for the support of research and education:

> **Standard grants** provide funding in a single fiscal year award to cover all of the proposed activities for the full duration (generally 1-5 years) of a project.
>
> **Continuing grants** provide funds for an initial period (usually one year) of a multiple year project with a statement of intent to continue funding in yearly increments, called "continuing grant increments" or CGIs, until completion of the project.

Of the 10,380 competitive awards made in FY 2004, 6,527, or 63 percent were standard grants, and the rest were continuing grants. Over the last decade, the number of standard grants increased by about 14 percent, while the number of continuing grants stayed relatively constant. In addition to the standard and continuing awards, NSF awarded 8,189 continuing grant increments (CGIs) based on proposals that had been competitively reviewed in earlier years.[2] As shown below in **Text Figure 2**, next page, NSF devotes 23 percent of its total budget to new standard grants and 17 percent to new continuing grants. The use of standard grants allows NSF the flexibility to make new awards each year without carrying a large burden of continuing grant obligations.

[1] The term "directorates" as used in this report, refers to NSF's seven programmatic directorates and the Office of Polar Programs (OPP). The Office of International Science and Engineering (OISE), formerly a division within the Directorate for Social, Behavioral and Economic Sciences, is now located within the NSF Director's Office. See NSF Organization Chart in Appendix Table 15, page 57.

[2] While the original award is a competitive action, the CGI is a non-competitive renewal grant. Continued incremental funding is based on NSF review of annual project reports.

Text Figure 2
Percentage of NSF Budget by Type of Award

	2000	2001	2002	2003	2004
Standard Grants	23%	25%	26%	23%	23%
Continuing Grants	21%	19%	21%	21%	17%
Continuing Grant Increments	38%	38%	35%	36%	39%
Centers, Facilities, and Other[3]	18%	18%	18%	20%	20%
100% = $Billion	$3.92	$4.46	$4.77	$5.37	$5.66

Broadening Participation

NSF's Strategic Plan (FY 2003 – 2008) includes as a specific objective the promotion of greater diversity in the science and engineering workforce through increased participation of underrepresented groups and institutions in all NSF programs and activities. NSF is committed to increasing the participation in all NSF activities of researchers, educators and students from groups currently underrepresented in the science and engineering enterprise. Funding rates over the last five fiscal years for all Principal Investigators (PIs), female and minority PIs[4], and prior and new PIs[5] are shown in **Text Figure 3** below. Proposals, awards and funding rates by PI characteristics are presented in **Appendix Table 2** on page 30.

Text Figure 3
Funding Rate by Fiscal Year and PI Characteristic

	2000	2001	2002	2003	2004
All	33%	31%	30%	27%	24%
Female	35%	32%	30%	28%	25%
Male	33%	31%	30%	27%	24%
Minority	32%	30%	29%	27%	23%
New	25%	24%	22%	19%	17%
Prior	40%	36%	35%	33%	29%

During FY 2004, female PIs received 2,118 awards. This is a slight increase from FY 2003 and represents 20 percent of the total NSF awards, compared to 19 percent in FY 2003. The funding rate for females fell from 28 percent to 25 percent, compared to the funding rate of 24 percent for males, which fell from 27 percent. The number of proposals received from female PIs increased by 15 percent in FY 2004, and by 53 percent from FY 2000.

[3] "Other" includes Organizational Excellence activities.
[4] Minority includes American Indian or Alaskan Native, Black, Hispanic, and Pacific Islander and excludes Asian and White, not of Hispanic Origin. Please note that the data on underrepresented groups are derived from information that the principal investigators submit on a voluntary basis. About 90 percent of principal investigators supply this information.
[5] A proposal is counted in the New PI category if the PI did not have an NSF award in the current or prior years.

In FY 2004, the number of awards to minority PIs increased to 597, a 5 percent increase over FY 2003. This is about six percent of the total number of NSF awards. The funding rate for minority PIs is 23 percent, slightly less than the overall funding rate. In FY 2004, minority PIs submitted 2,551 proposals, up 19 percent from last year and up 72 percent from FY 2000. **Appendix Table 3**, page 31, provides a breakdown of funding rates by the race/ethnicity of the minority Principal Investigators.

There continues to be a wide disparity in the funding rates of *new PIs* and *prior PIs* (17 percent and 29 percent, respectively, in FY 2004). There are a number of possible reasons for this; for example, prior PIs are more likely to have established research agendas and are thus able to cite the results of previously funded projects in their subsequent proposals. In the case of new PIs who have conducted research, but are approaching NSF as a funding source for the first time, it may take more than one proposal submission to experience success. As indicated in Appendix Table 2, page 9, in FY 2004 new PIs submitted 19,052 proposals, up 8 percent from last year. As average award sizes increase (see below, page 11), it is possible that more researchers, engineers, and educators are drawn to NSF opportunities.

The funding rate for *research-intensive Ph.D. institutions*, defined as the top 100 Ph.D.-granting institutions ranked according to the amount of FY 2004 funding received from NSF, is slightly higher than the overall funding rate for NSF as a whole, i.e., 26 percent compared to 24 percent. The funding rate for *non-research intensive Ph.D. institutions* in FY 2004 (i.e., the Ph.D.-granting institutions that are not in the top 100 NSF-funded category) was considerably less than the overall funding rate, at 17 percent. Two- and four-year institutions experienced funding rates of 23 percent and 25 percent, respectively for FY 2004. For minority-serving institutions, the FY 2004 funding rate was 20 percent.

In FY 2005 and beyond, NSF will be making efforts to increase the number of proposals submitted by and awards made to scientists and engineers from underrepresented groups. A key element of NSF's strategy includes the use of information technology and connectivity to inform and engage under-served individuals, groups, institutions, and communities in science and engineering. In FY 2005, for example, NSF released its new, redesigned web site as a more approachable, exciting, and vivid means of outreach (www.nsf.gov). NSF also relies on face-to-face interactions. Twice a year NSF staff conduct regional grants workshops for new faculty, researchers, and administrators. The slide presentation from a recent grants workshop is included at the end of this report, starting on page 59. In May 2005 NSF plans to conduct an outreach grants workshop specifically for tribal colleges and universities.

Distribution of Awards by Sector/Institution

Through its Budget Internet Information System,[6] NSF keeps track of its awards by type of institutions. As shown in **Text Figure 4**, next page, in FY 2004 NSF awarded 76 percent of its budget to academic institutions, 15 percent to non-profit and other institutions, 7 percent to for-profit businesses, and 2 percent to Federal agencies and laboratories. The overall distribution of funds by performer has remained fairly constant over the past three years.

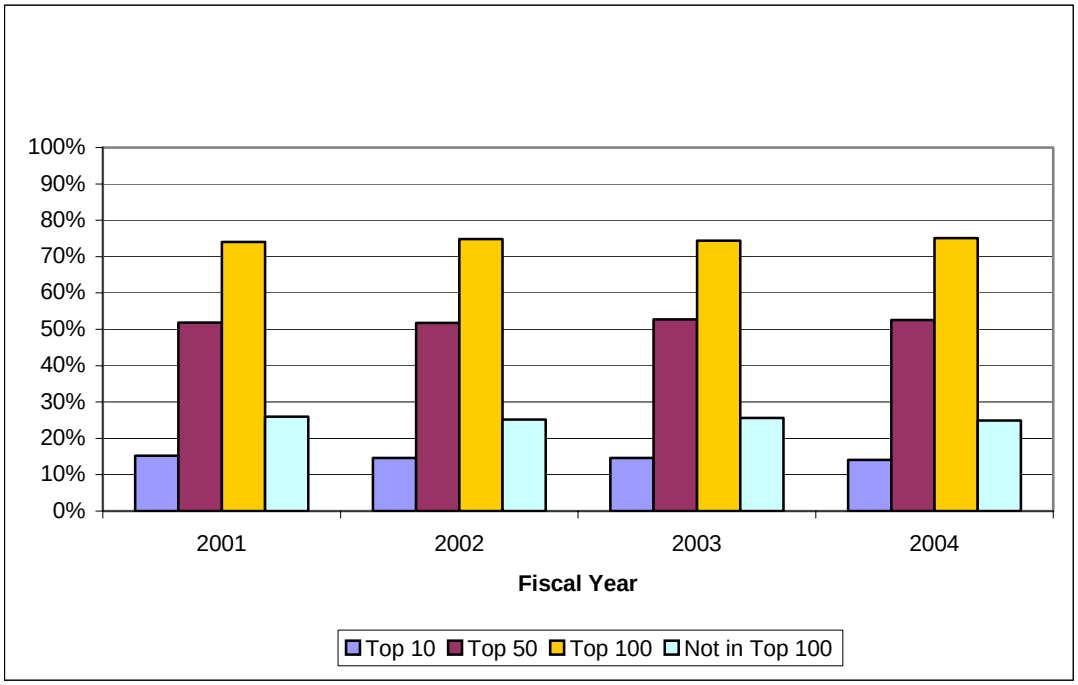
[6] The Budget Internet Information System is available on the web at < http://dellweb.bfa.nsf.gov/>.

Text Figure 4
Distribution of NSF Awards by Performing Institution

Fiscal Year						
	2002		2003		2004	
Type of Performer	**$M**	**%**	**$M**	**%**	**$M**	**%**
Federal	89	2%	108	2%	100	2%
Industry	323	7%	337	7%	360	7%
Academe	3,489	76%	3,950	76%	4,159	76%
Non-Profit & Other	697	15%	762	15%	801	15%
TOTAL	4,599	100%	5,157	100%	5,420	100%

As noted on the previous page, NSF classifies academic institutions according to the proportion of NSF funding they receive. As seen below in **Text Figure 5**, the percent of NSF awards made to the "top funded" (i.e., the institutions receiving the largest proportion of NSF funding) ten, top funded fifty, and top funded one hundred academic institutions has remained within a narrow range over the past three years. In FY 2004, the top 10 funded institutions receive 14 percent of NSF awards while 25 percent of NSF awards are made to institutions that are not in the top 100 funded schools.

Text Figure 5
Percent of Awards to Top Funded Academic Institutions
Fiscal Year 2001 – 2004

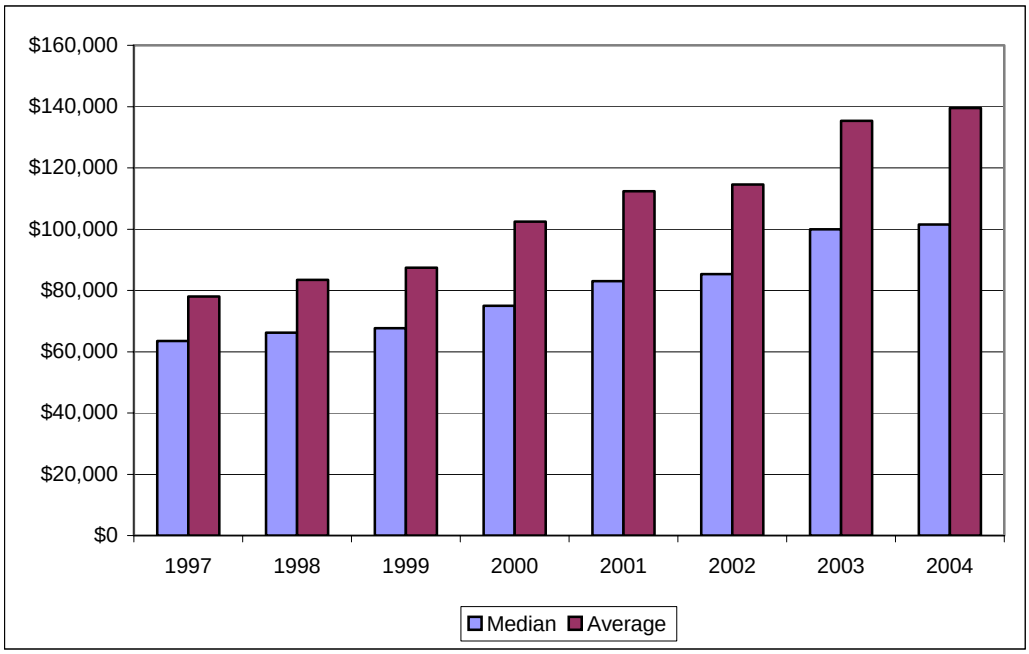


Award Amounts and Duration

The average annualized award amount for *research grants*[7] in FY 2004 was $139,522, an increase of 3 percent from the previous year and 22 percent above FY 2002. The median award[8] was $101,566, a slight increase over the previous year and 19 percent above FY 2002's level.[9] Text Figure 6, below, displays average and median NSF award amounts from FY 1997 to FY 2004. Data by NSF directorate for the last five years are presented in **Appendix Table 4**, page 31.

Adequate award size is important both for attracting high-quality proposals and for ensuring that proposed work can be accomplished as planned. Larger awards permit the participation of more students and allow scientists and engineers to devote a greater portion of their time to actual research rather than writing and reviewing proposals.

Text Figure 6
Award Amounts
Competitively Reviewed Research Awards



[7] *Research Grants* is a subset of total NSF awards associated primarily with individual investigator and group research projects. These do not include education and training grants, which are primarily multi-institution and of a much larger average size.

[8] The difference between the median and average award amounts reflects the effect of numerous small awards on the median, and a few large awards on the average award amount.

[9] In FY 2003 and FY 2004 collaborative awards in which participating institutions submitted separate proposals for the same project were consolidated for the purpose of determining award size. In FY 2002 collaborative proposals were counted as separate awards. Even if collaboratives were treated as separate awards, award size would still be increasing.

Longer award terms are important in increasing the effectiveness of principal investigators and graduate students. Less time is spent preparing proposals, and graduate students are able to have more time to do their thesis work. NSF's FY 2004 GPRA goal was to achieve an average award duration of 3.0 years for research grants. The actual result was 2.96 years, thus NSF was not successful for this goal. Program directors must balance competing requirements, such as increasing award size, increasing duration of awards, and/or making more awards. NSF will continue to give careful attention to award size and duration in the context of recent declines in success rates.

Proposal Processing Efficiency – Time to Decision (Proposal Dwell Time)
It is important for applicants to receive a timely funding decision. NSF's FY 2004 GPRA performance goal was, for at least 70 percent of proposals, to inform applicants whether their proposals have been declined or recommended for funding within six months of receipt. As indicated in **Text Figure 7**, below, NSF surpassed this goal. In FY 2004, 77 percent of all proposals were processed within six months, the same percentage achieved in FY 2003, compared to 74 percent in FY 2002 and 63 percent in FY 2001. The achievement of this goal is particularly significant because the last two years have seen major increases in the number of proposals submitted, thus adding to the merit review workload of program staff.

Text Figure 7
Proposal Dwell Time
Percentage of Proposals Processed Within 6 Months

Fiscal Year	**2000**	**2001**	**2002**	**2003**	**2004**
Percentage	54%	63%	74%	77%	77%

3. The Proposal Review Process

The NSF proposal process starts with electronic receipt of the proposal, which is then forwarded electronically to the appropriate NSF program for review. All proposals are reviewed by a scientist, engineer, or educator serving as an NSF program officer, and usually by three or more experts from outside NSF in the particular fields represented in the proposal. Program officers at NSF follow the merit review process guidelines found in NSF Manual #10, *The Proposal and Award Manual*, Chapter V, available on the internal NSF web page. For example, the program officer exercises care to assure that the external reviewers have no conflicts of interest. *The Proposal and Award Manual* also requires a minimum of three external reviews for most proposals. The proposal review timeline is summarized in the first slide of the attached grants presentation, page 59.

Proposers may suggest names of persons they believe are especially well qualified to review the proposal, along with persons who they believe should not review the proposal. These suggestions may serve as an additional resource in the reviewer selection process, at the program officer's discretion. Program officers also rely on their knowledge of what is being done by whom in their research and education area, the references listed in the proposal, recent publications and professional meetings, bibliographic databases, and recommendations from

other reviewers. Program officers may obtain comments from assembled review panels or from site visit teams before recommending final action on proposals.

Senior NSF staff at the division or section level further review the program officer's recommendations for awards and declinations. When a decision has been made, verbatim copies of reviews, excluding the names of the reviewers, and summaries of review panel deliberations, if any, are provided to the proposal author.

Review Processes Used at NSF

NSF's proposal review system relies on extensive use of knowledgeable experts from outside the Foundation. Expert judgments of which proposals best address the merit review criteria established by the National Science Board inform Foundation staff and influence funding recommendations. NSF programs obtain external peer review by three principal methods: (1) "mail-only," (2) "panel-only," and (3) "mail-plus-panel" review. In addition, site visits by NSF staff and external members of the community are often used to review proposals for facilities and centers. NSF program officers are given discretion in the specific use of review methods, subject to higher-level review.

In the "mail-only" review method, reviewers are sent proposals and asked to submit written comments to NSF through FastLane, NSF's web-based system for electronic proposal submission and review. These mail reviews are then used by the NSF program officer in his or her decision to recommend an award or declination.

"Panel-only" review refers to the process of soliciting reviews only from those who meet in a panel review setting to discuss their reviews and provide advice directly to the program officer. Most programs that use this process provide proposals to panelists and receive their reviews before the panel meeting.

Many proposals submitted to NSF are reviewed using some combination of these two processes ("mail-plus-panel" review). Those programs that employ the mail-plus-panel review process have developed several different configurations, such as:

- A reviewer is asked to submit a written mail review and also serve as a panelist; and

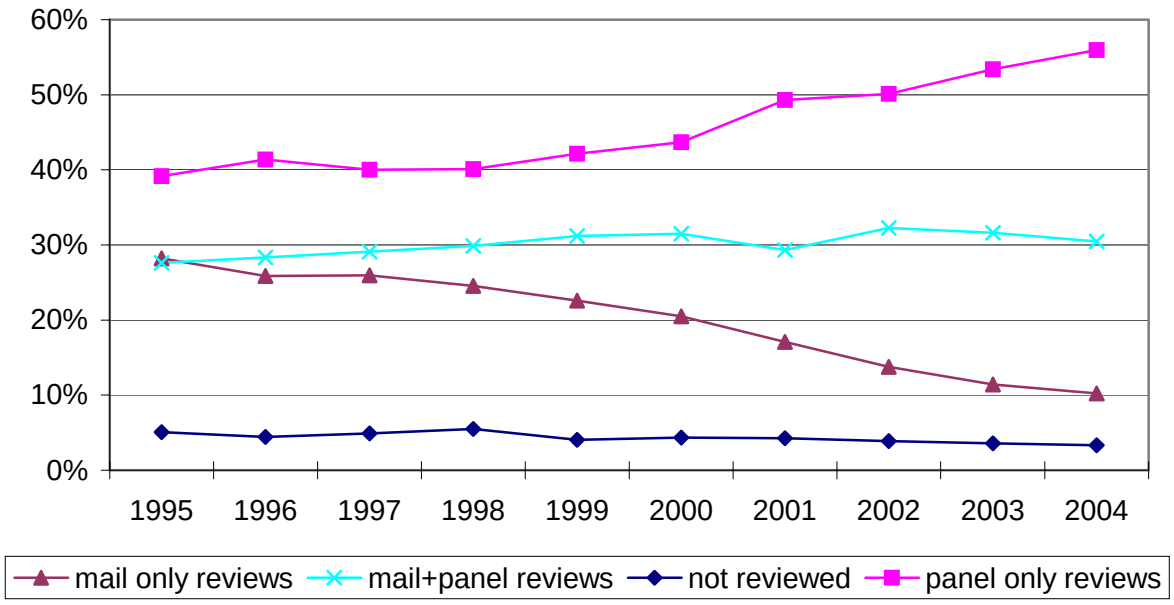
- A reviewer is asked to participate only as a panelist, with responsibility only for reviewing and discussing mail reviews written by others and providing verbal and/or written advice to the program officer.

The use of various review methods has changed markedly over time, as shown below in **Text Figure 8**, below, next page, and the corresponding **Appendix Table 5** (page 32). Since 1995 the percentage of NSF proposals reviewed by panel-only has increased from 39 to 56 percent of all proposals. During the same period, there has been a steady decline in the use of mail-only review

from 28 to 10 percent. The use of mail-plus-panel review increased from 28 to 32 percent between FY 1995 and 2003, dropping slightly to approximately 31 percent in FY 2004.[10]

There are a number of reasons for the trend toward panel review. Panels allow reviewers to discuss and compare proposals. Panels tend to be used for programs that rely on concrete deadlines as opposed to target dates. The panel review process has advantages in the evaluation of multidisciplinary proposals or interdisciplinary proposals in new or developing research areas because, unlike mail-only review, viewpoints representing several disciplines can be openly discussed and integrated. In a similar fashion, the panel review discussion facilitates consideration of both merit review criteria. Finally, the panel review process usually requires fewer individual reviewers per proposal than the mail-only process. A panel of 25 reviewers could possibly review 200 proposals, while it may require several hundred requests for mail reviewers to review the same proposals. Also, using panels in the review process tends to reduce proposal processing time (time-to-decision), compared to mail-only reviews. For example, in FY 2004, 80 percent of all proposals reviewed by panel-only were processed within six months, compared to 73 percent for mail-plus-panel and 65 percent for mail-only.

Text Figure 8
FY 1995-2004 Trend, NSF Review Method
(Percentage of Proposals)



[10] During this period of about 10 years, between three and six percent of the proposals were not externally reviewed; these include proposals for conferences or symposia, small grants for exploratory research, and other special types of proposals that are subject to internal but not external review.

Mail review often takes more time because additional reviews must be requested when some of the reviewers in the first set decline to review the proposal. The chief advantages of mail review are: (1) the expertise of the reviewers can be more precisely matched to the proposal, and (2) it is less expensive (there are no travel costs). The mail-plus-panel review process is used frequently because it combines the in-depth expertise of mail review with the more comparative analysis of panel review.

Some programs are continuing to experiment with "virtual panels," combining the virtues of mail review and panel review. In virtual panels, panelists participate from their offices or homes and interact electronically using NSF's Interactive Panel System (IPS), accompanied by a teleconference. Around 84 percent of panels, whether they assemble at NSF or virtually, are using IPS. A part of Fastlane, IPS permits the viewing of proposals, reviews, basic panel discussions, collaboration on panel summaries, and approval of the draft panel summary through the web. Some programs are making use of NSF's videoconferencing facilities to enhance the participation of panelists whose schedules do not permit them to be physically present at the time of the panel. Videoconferencing is also employed in award management and oversight for large center-type projects. NSF is continuing its efforts to improve web-based and electronic means of communication to contribute to the quality of the merit review and award oversight processes.

Directorate-level data on the use of different review processes during FY 2004 are presented in **Appendix Table 6,** page 32. NSF Directorates vary in their use of proposal review methods. Mail-plus-panel review was the predominant review process used in the Directorates of Biological Sciences, Geosciences, and Social, Behavioral and Economic Sciences, while panel-only review was the predominant method in the Directorates of Computer & Information Science & Engineering, Education and Human Resources, Engineering, and Mathematical & Physical Sciences. Mail-only review was the most common mode of review in the Office of Polar Programs and the Office of International Science and Engineering.

Reviews and Reviewers

NSF policy, as stated in *The Proposal and Award Manual* requires at least three external reviews for each award or decline recommendation on a proposal, unless the requirement has been waived (e.g., for certain workshop proposals or special types of awards). The total numbers of reviews and the average numbers of reviews per proposal obtained by the three different review methods are presented in **Text Figure 9,** next page. As expected, the mail-plus-panel method had the highest number of reviews per proposal, averaging well over seven, while the mail-only method averaged around four.

Directorate-level data for FY 2004 are presented in **Appendix Table 7,** page 33. The variation among directorates in the number of reviews per proposal reflects both their preferences for the different review methods, and differences in the way directorates count reviewers in the panel review process.

Text Figure 9
Reviews per Proposal, FY 2004

	All Methods	Mail-plus-Panel	Mail-Only	Panel-Only
# of Reviews	254,490	102,427	19,021	133,042
# of Proposals	42,394	13,345	4,496	24,553
Reviews per Proposal	6.0	7.7	4.2	5.4

Diversity of the reviewer pool is an important feature of the merit review system. Reviewers from diverse backgrounds help ensure that a wide range of perspectives is taken into consideration in the review process. NSF emphasizes reviewer diversity through a variety of processes, including use of a large and expanding Foundation-wide reviewer database, explicit policy guidance, mandatory training for all program officers, and directorate-level initiatives.

NSF maintains a central electronic database of about 300,000 reviewers. Program officers identify potential reviewers using a variety of sources including their own knowledge of the discipline, applicant suggestions, references attached to proposals, published papers, scientific citation indexes and other similar databases, and input from mail reviewers, panelists, and visiting scientists (see grants workshop presentation, page 63). During FY 2004, 51,000 reviewers were sent one or more proposals for mail review and 12,000 reviewers served as panelists. In all, 58,000 individuals served on panels, were sent a proposal for mail review, or served in both functions. About 13,000 of these reviewers had never reviewed an NSF proposal before. The reviewers came from all 50 states in addition to the District of Columbia, Guam, and Puerto Rico. More than 5,000 reviewers came from outside of the United States. Moreover, reviewers came from a range of institutions, including two-year and four-year colleges and universities, Master's level and Ph.D.-granting universities, industry, and government. FY 2004 data are available on numbers of reviewers from each state, territory, and country as well as by type of institution.

In FY 2001, NSF developed systems and policies to request demographic data electronically from all reviewers to determine the participation of underrepresented groups in the NSF reviewer pool. The goal was to establish a baseline for participation of underrepresented groups in NSF proposal review activities. In FY 2004, out of a total of 41,263 distinct reviewers who returned reviews, 7,092 – about 17 percent -- provided demographic information. Out of the 7,092 who provided information, 2,449 (35%) indicated they were members of an underrepresented group (i.e., minority or women; see Note 4, above, page 8, for a definition of minority). Provision of demographic data is voluntary and, given the low response rate, there is not enough information to establish a baseline. In FY 2004, NSF altered the FastLane reviewer module to make it more convenient for reviewers to provide demographic information. A preliminary examination has shown a slight increase in the proportion of reviewers providing information after the FastLane change. NSF will continue to monitor the situation and take additional measures as needed to obtain the data necessary to evaluate increased participation in the merit review process.

NSF continually updates its Library resources, including databases, web pages, and directories, and conducts frequent tutorials on finding reviewers. Other activities include the collection and sharing of potential reviewer data from associations and institutions serving groups that are underrepresented in science and engineering, and encouraging participation of members of

underrepresented groups in NSF workshops and conferences. For example, in May 2005, NSF plans to conduct an outreach grants workshop specifically for tribal colleges and universities (see also the grants workshop presentation starting on page 59, below).

Participation in the peer review process is voluntary. Panelists are reimbursed for expenses; mail reviewers receive no financial compensation. In FY 2004, 59 percent of requests for mail reviews elicited positive responses, slightly up from 58 percent in FY 2003 and 2002. In FY 2001 the response rate was 60 percent.

Merit Review Criteria

In FY 1998 the National Science Board approved the use of the two current NSF merit review criteria now in effect:

> **What is the intellectual merit of the proposed activity?** How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields? How well qualified is the proposer (individual or team) to conduct the project? (If appropriate, the reviewer will comment on the quality of prior work.) To what extent does the proposed activity suggest and explore creative and original concepts? How well conceived and organized is the proposed activity? Is there sufficient access to resources?
>
> **What are the broader impacts of the proposed activity?** How well does the activity advance discovery and understanding while promoting teaching, training, and learning? How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)? To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks and partnerships? Will the results be disseminated broadly to enhance scientific and technological understanding? What may be the benefits of the proposed activity to society?

In FY 1999 NSF established annual Government Performance and Results Act (GPRA) performance goals to increase reviewer and program officer attention to both merit review criteria. Currently NSF Committees of Visitors and NSF Staff provide an annual evaluation of the Foundation's use of the merit review criteria. In the National Science Board discussions, members expressed concern that the broader impacts criterion was not being fully integrated into the review process, and that principal investigators and reviewers are unsure how it should be addressed. They agreed that efforts to ensure that both criteria are addressed in proposals and reviews should be continued and they asked staff to periodically report on these efforts.

Since then, the Foundation has completed the following actions to raise awareness of the importance and use of the merit review criteria:

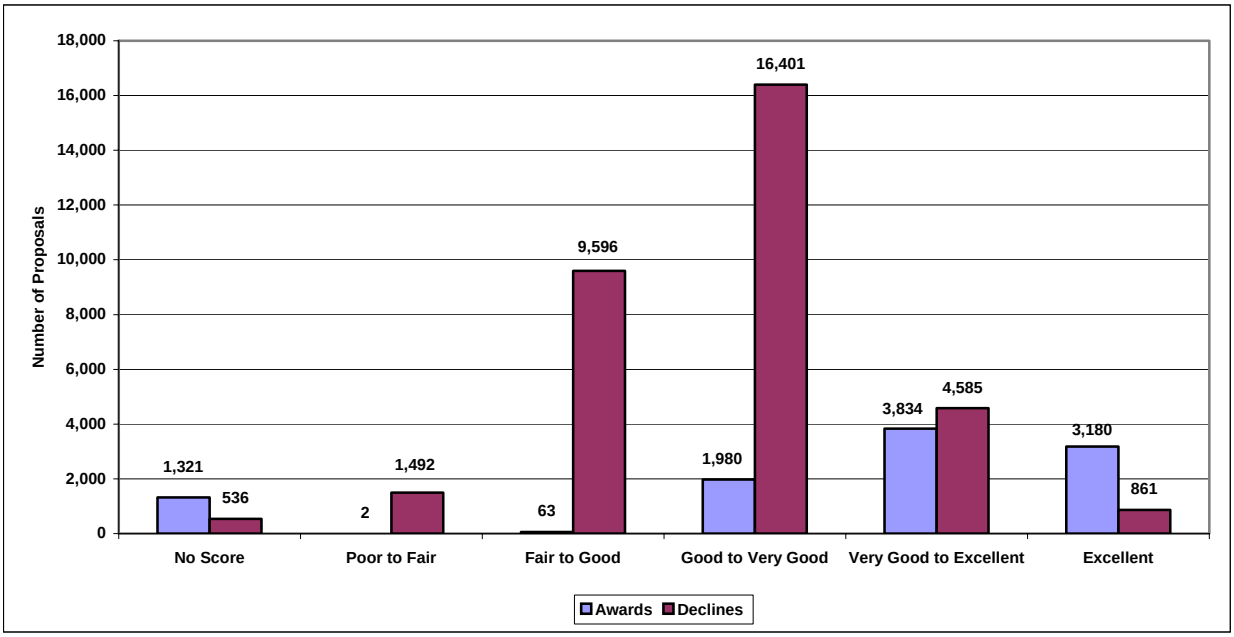
- Developed a draft set of examples of activities that address the broader impacts criterion. NSF disseminates the set to proposers via a link embedded in the Grant Proposal Guide (http://www.nsf.gov/pubs/gpg/broaderimpacts.pdf). In addition, the examples are available to proposers and reviewers via FastLane.

- Drafted revisions to the FastLane Proposal Preparation Guidelines and the standard language in the Program Information Management System (PIMS) that instructs proposers that they *must* clearly address broader impacts in the project summaries of their proposals.
- Revised its guidance to proposers in the Grant Proposal Guide to stipulate that Principal Investigators must address both merit review criteria in separate statements within the one page Project Summary. The Grant Proposal Guide also reiterates that broader impacts resulting from the proposed project must be addressed in the project description and described as an integral part of the narrative. Effective October 1, 2002, NSF returned without review proposals that failed to separately address both merit review criteria within the project summary. For FY 2004, 236 proposals were returned with out review due to the failure to address the merit review criteria in the summary; the number of returned proposals for the previous fiscal year was 276.
- Revised guidance in the Proposal and Award Manual to require program officers to comment on both the intellectual merit and the broader impacts of the proposed activity as part of the review analysis of the proposal.
- Updated NSF's reviewer forms to provide the capability for reviewers to comment separately on both criteria in the review of a proposal.
- Examined reviewer utilization of the broader impacts criterion and concluded that 92 percent of reviews addressed both intellectual merit and broader impacts in FY 2004, compared to 90 percent of reviews in FY 2003 and 84 percent in FY 2002.

Reviewer Proposal Ratings

The NSF merit review system emphasizes reviewer narratives in addition to numerical ratings. The written comments provided by reviewers, the summary of panel discussions, and the expert judgments of program officers are important components of the merit review system. Summary ratings are another indicator of reviewer judgment. The distribution of average summary ratings of reviews for awarded and declined proposals is provided in **Text Figure 10,** next page**.**

Text Figure 10
Distribution of Average Reviewer Ratings



These data indicate considerable overlap among the average reviewer ratings of successful and unsuccessful proposals, most notably in the range of "very good" average ratings.[11] **Appendix Tables 8-10,** pages 34-36**,** indicate that this overlap among the average reviewer ratings is present and similar in degree for each of the three proposal review methods used by NSF (panel-only, mail-only, and mail plus panel).

NSF Program Officer Recommendations

As noted above, the narrative comments and summary ratings provided by external reviewers are essential inputs that inform the judgment of the program officers who formulate award and decline recommendations to NSF's senior management.

NSF program officers produce and manage a portfolio of awards, which must be appropriately balanced among various issues and objectives. For example, in addition to information contained in the external proposal reviews, NSF program officers must consider issues such as:

- Potential impact on human resources and infrastructure;
- Balance of different approaches to significant research questions;
- Support for high-risk proposals with potential for significant advances in a field;
- NSF core strategies, such as the integration of research and education;
- Achievement of special program objectives and initiatives;

[11] The corresponding numerical ratings, on a five-point scale, are as follows: Excellent (4.5 – 5.0); Very Good – Excellent (4.0 - <4.5); Good – Very Good (3.0 - <4.0); Fair – Good (2.0 - <3.0); and Poor – Fair (<2.0). Proposals with "No Score" include small grants for exploratory research and workshop/symposia proposals that do not require external review.

- Balance of the overall program portfolio, considering other available funding sources; and
- Geographic distribution.

These issues are especially important in making difficult award/decline recommendations among proposals that are in the middle reviewer rating range (i.e. proposals with "very good" average ratings). Each program officer must use sound judgment in arriving at a well-balanced portfolio of research and education awards within a given program. In addition, each program officer annually reports results from awards in their portfolio, explaining what makes the projects exciting, high risk and/or multidisciplinary.

Program Officer Characteristics and Workload

The number of program officers increased slightly from 380 in FY 2003 to 385 in FY 2004. The characteristics of NSF program officers are presented in **Text Figure 11**.

Text Figure 11
Distribution of NSF Program Officers by Characteristics
As of October 1, 2004

Program Officers	Total	Percent
Total	**385**	**100%**
Gender		
Male	**253**	**66%**
Female	**132**	**34%**
Race		
Minority	**90**	**23%**
White, Non-Hispanic	**294**	**76%**
Unknown	**1**	
Employment		
Permanent	**193**	**50%**
Visiting Scientists, Engineers & Educators (VSEE)	**33**	**9%**
Temporary	**49**	**13%**
Intergovernmental Personnel Act (IPA)	**110**	**29%**

Source: NSF Division of Human Resource Management
Notes: VSEE: Individual employed as a Visiting Scientist, Engineer, or Educator (formerly termed "Rotator"). IPA: Individual employed under the Intergovernmental Personnel Act.

Program Officers can be permanent NSF employees or non-permanent employees (includes Visiting Scientist, Engineer, or Educator; Temporary; and Intergovernmental Personnel Act

categories). About 50 percent of program officers fall into the non-permanent category. Some non-permanent program officers are "on loan" as visiting scientists, engineers, and educators (VSEEs) for up to three years from their host institutions. Others are employed through grants to the home institutions under the terms of the Intergovernmental Personnel Act (IPA). The number of IPA Program Officer positions has increased in recent years. Non-permanent employees provide NSF with new ideas and fresh science and engineering perspectives. They bring transformative knowledge of the most recent disciplinary and interdisciplinary developments to enhance NSF's responsiveness and agility. NSF provides training in the merit review process to all incoming program officers.

In the last ten years, NSF's budget has doubled, but the agency's staffing level has increased by less than five percent. To examine the needs and opportunities created by growth in workload and workload complexity, NSF has been undertaking a major, multi-year business analysis, using an outside contractor (Booz Allen Hamilton). The results of the business analysis are pointing to strategies that will enable NSF to respond to challenges such as merit review of proposals and management of awards involving increasingly multi-disciplinary and collaborative research and education.

For example, preliminary data from the contractor's ongoing analysis indicate that the increasing volume and complexity of proposals has had an impact on the effectiveness of program officers in performing their merit review and award management responsibilities. According to the analysis, a program officer manages an average of 90 competitive proposal actions, 82 active awards, and 67 post-award actions per year. Further, the analysis indicates that program officers spend approximately 55 percent of their time on merit review alone, yet they also are responsible for award management and oversight, program planning, staff oversight, community outreach, and other tasks.

NSF continues to monitor workload issues that have an impact on the merit review process. NSF developed an overall human capital management plan and is taking steps to address the program officer workload issue. The addition of Science Assistant positions along with more program officers, for example, has helped to alleviate rising workloads. NSF had 32 Science Assistant positions in FY 2004, compared to 37 positions in FY 2003, and 20 positions in FY 2002. These staff members assist program officers in the proposal review and award process. Another step toward increased efficiency is the electronic jacket, or "eJacket." EJacket provides a single, web-based interface to process proposals electronically from receipt in Fastlane to Division Director concurrence in award or decline recommendations. NSF is developing eJacket in phases to allow for its experimental use and feedback by program staff. As another step in its human capital management plan, NSF is revitalizing its in-house curriculum for program staff and offering new courses in project management, leadership, and communication through the NSF Academy.

<u>Assuring Objectivity in the Merit Review Process</u>

NSF program officers carefully check all proposals for potential conflict of interest and select expert outside reviewers with no apparent potential conflicts. All reviewers are provided guidance and instructed to declare potential conflicts. All program officers receive conflict-of-interest training annually.

Each program officer's recommendation to award or decline a proposal is subject to a programmatic review by a higher level reviewing official (usually the Division Director), and an administrative review by a grants officer in the Office of Budget, Finance, and Award Management (BFA). The Director's Review Board (DRB) reviews all award recommendations with an average annual award amount of 2.5 percent or more of a Division's annual budget. The National Science Board reviews and approves all recommended awards where the average annual award amount is 1 percent or more of the awarding Directorate's annual budget.[12] Every applicant whose proposal undergoes merit review receives a letter stating the results, a panel summary explaining the rationale for the decision (if panel review was used), along with an anonymous verbatim copy of each review that was considered in the review process. An unsuccessful applicant may ask the program officer for additional clarification of the decision. If after considering this additional information the applicant is not satisfied that the proposal was fairly handled and reasonably reviewed, he or she may request formal reconsideration from the Assistant Director (AD). This request can be based on the applicant's perception of procedural errors or on disagreements over the substantive issues dealt with by reviewers. If the AD upholds the original action, the applicant's institution may request a second reconsideration from the Foundation's Deputy Director.

NSF declines approximately 30,000 proposals a year but receives only 30-50 requests for formal reconsideration. The number of requests for formal reconsideration and resulting decisions at both the AD and O/D levels from FY 2000 through FY 2004 are displayed in **Appendix Table 11**, page 37. Out of the 188 requests for formal reconsideration of declined proposals during the past five years, 12 decisions have been reversed.

In 2003 NSF's business analysis contractor surveyed a large number of both awardees and those whose proposals had been declined. In general, all respondents were satisfied with the mechanics of the process. However, as NSF's Advisory Committee for Government Performance and Results Act (GPRA) Performance Assessment noted in its July 2004 report (see below, page 26), the survey indicated that NSF could do a better job providing feedback to proposal authors, increasing the level of reviewer accountability, and paying more attention to the consistency of reviews. While the Advisory Committee did not reach a consensus on the effectiveness of the merit review process for the review of interdisciplinary/multidisciplinary proposals, the Advisory Committee urged NSF to focus on achieving consistent review practices for these types of proposals. With respect to high-risk research, the Advisory Committee urged a broader discussion of the issue, given the absence of a clear definition.[13] In response to concerns about the uncertainty of what constitutes "high-risk" and "multidisciplinary," NSF is now collecting explanations of projects that program officers identify as either high-risk or multidisciplinary. Program officers will be asked to explain why the projects fit into those categories. Will common themes and terminology emerge? The next meeting of the Advisory Committee for GPRA Performance Assessment will discuss this question.

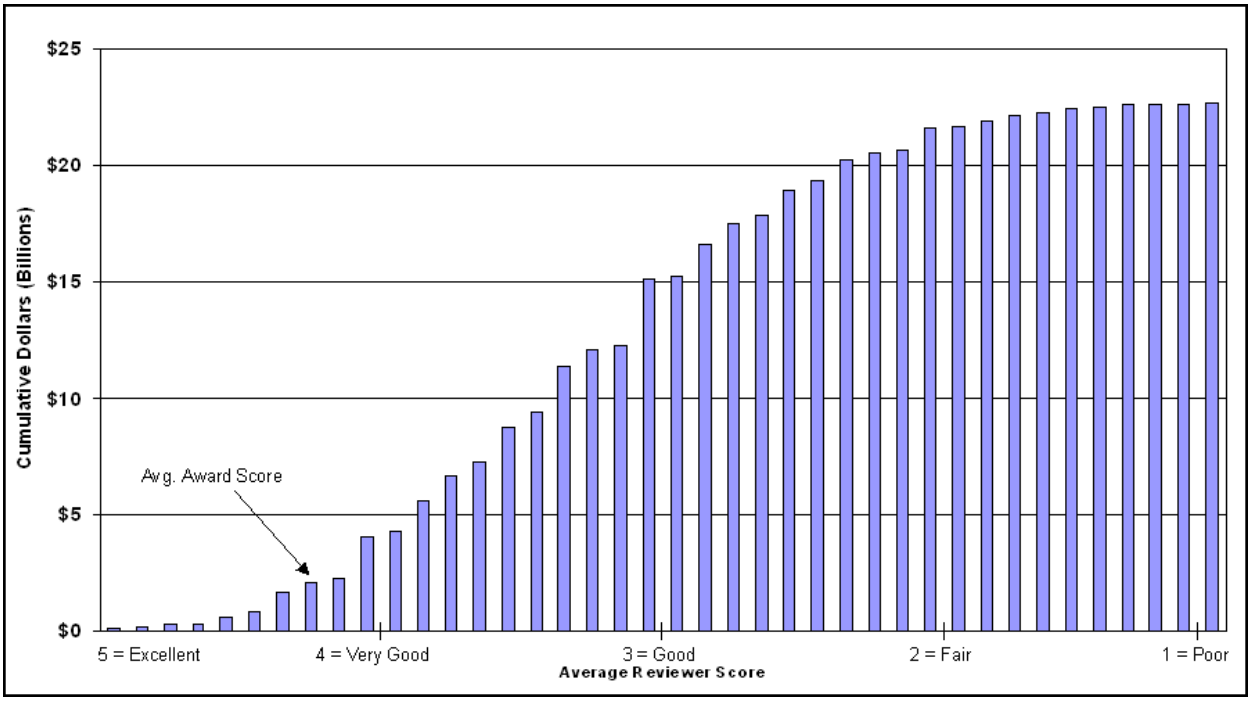
[12] Other items requiring NSB prior approval are new programs and major construction projects that meet certain specifications. In FY 2004, the Board reviewed and approved ten recommended awards.
[13] "Report of the Advisory Committee for GPRA Performance Assessment," July 2004, *passim*. Available at http://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf04216. See also note 19, below.

4. Other Issues Related to Merit Review

Budgetary Considerations

A large number of potentially fundable proposals are declined each year. **Text Figure 12** below, indicates that in FY 2004, close to $2.1 billion was requested for declined proposals that had received ratings at least as high as the average rating (4.2) for an awarded proposal. These declined proposals represent a rich portfolio of unfunded opportunities – fertile ground for learning and discovery that lies fallow. There may be a large number of proposals in the declined Good to Very Good range of proposals that, if supported, could produce substantial research and education benefits.

Text Figure 12
Cumulative Requested Amounts of Declined Proposals
By Average Reviewer Score for FY 2004



Doing Business Efficiently and Effectively

The NSF Strategic Plan for FY 2003-2008 established the goal of organizational excellence, and the goal was first evaluated in FY 2004. Two external advisory committees led the evaluation: the Advisory Committee for Business and Operations (AC/B&O) and the Advisory Committee for GPRA Performance Assessment (AC/GPA). The AC/B&O found that NSF had

demonstrated significant achievement in the three indicators of organizational excellence: human capital, technology-enabled business processes, and performance assessment.

This increased emphasis on organizational excellence speaks to NSF's efforts under the President's Management Agenda (PMA). The PMA launched a government-wide effort in 2001 to improve the management, performance, and accountability of federal agencies. An Executive Management Scorecard is now issued quarterly by the Office of Management and Budget (OMB) to track the progress of agencies in meeting specific criteria under the initiatives that constitute the PMA. The five initiatives include strategic management of human capital; competitive sourcing; improved financial performance; expanded electronic government; and budget-performance integration. In FY 2003 NSF received the highest possible ratings for improved financial performance and expanded electronic government, the only federal agency to have two successful ratings that year.[14] In FY 2004, NSF maintained its high ratings for financial performance and electronic government. The successful rating in electronic government is particularly relevant to the merit review process, since it is based in part on continuing improvements to FastLane, NSF's interactive system used to conduct business with the grantee community over the Internet. In addition, Ejacket is being developed and released in phases for NSF's comprehensive proposal review and grants management functions.

In March 2004, the Office of Management and Budget (OMB) formed a Grants Management Line of Business task force as part of its government-wide business consolidation efforts. The National Science Foundation and the Department of Education were invited to be co-managing partners of this task force. The vision of the task force is to create a government-wide framework to support end-to-end grants management activities that promote citizen access, customer service, financial and technical stewardship, achieve agency missions, and ensure efficiencies and economies of scale.

NSF also focuses on enhancing customer service. In FY 2004, 100 percent of all NSF program announcements were available at least three months before the proposal due date, and 77 percent of proposals were processed within six months of submission. Both results were significant accomplishments that represented multi-year efforts across the Foundation.

Performance Evaluation

Operating a credible, efficient merit review system is one of the four critical objectives in NSF's FY 2003-2008 Strategic Plan.[15] Performance evaluation, with respect to the operation of the merit review system, is currently supported with information from the following activities:

- **Applicant and Grantee Information/Merit Review.** All applicants and grantees provide results from previous NSF support, information about existing facilities and equipment available to conduct the proposed research, biographical information on the primary investigators, other sources of support, and certifications specific to NSF. Such information is required at the time of application, at the time of an award, and in annual and final project

[14] For the current "Management Scorecard Update," please see http://www.whitehouse.gov/results/agenda/scorecard.html.

[15] The NSF Strategic Plan, FY 2003 – 2008, is available at http://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf04201>.

reports. It is reviewed by NSF staff, used during merit review and included in the package of information available to external committees conducting performance assessment.

- **Program Evaluation by Committees of Visitors (COVs).** To ensure the highest quality in processing and recommending proposals for awards, NSF convenes Committees of Visitors (COVs) to review each program approximately every three to five years. This includes disciplinary programs in the various directorates and offices, and the cross-disciplinary programs managed across directorates. The COVs are comprised of scientists, engineers and educators who convene at NSF for a two to three day assessment. These experts evaluate the integrity and efficiency of the processes used for proposal review and program decision-making. In addition, the COVs provide a retrospective assessment of the quality of results of NSF's programmatic investments. The COV reports, written as answers and commentary to specific questions (see "Core Questions and Report Template," **Appendix Table 12** on pages 38-45) are submitted for review through Advisory Committees to the directorates and the NSF Director. Questions include aspects of the program portfolio, such as the balance of high-risk, multidisciplinary, and innovative projects. The recommendations of COVs are reviewed by management and taken into consideration by NSF when evaluating existing programs and future directions for the Foundation.[16] See **Appendix Table 13**, pages 46-55, for a schedule of COV program evaluations.

  The U.S. General Accounting Office (GAO) examined NSF's COV process in early 2003 and found that it demonstrated a high capacity for evaluation, the elements of which included an evaluation culture, data quality, analytic expertise, and collaborative partnerships.[17] Later in the year NSF's Office of Inspector General (OIG) reported on its audit of the COV process. The OIG found that NSF makes good use of the COV reports to better manage its science, engineering, and education programs. In addition, The OIG concluded that NSF relies on the COV reports as an important source of information in determining its performance to meet strategic goals under GPRA.[18] As a result of OIG recommendations to improve the COV process, NSF required Directorates and Offices to document the action taken on those accepted COV recommendations and to provide COVs, prior to their meeting, with the written record of the actions taken in response to the recommendations made by the previous COV. NSF also makes recent COV reports available to incoming staff.

- **Advisory Committee (AC) Reporting on Directorate/Office Performance.** Advisory committees advise the seven directorates and the Office of Polar Programs and Office of International Science and Engineering. They are typically composed of 15-25 experts who have broad experience in academia, industry and government. The role of the ACs is to provide advice on priorities, address program effectiveness, review COV reports, and examine directorate/office responses to COV recommendations. In FY 2001 and previous years, directorate/office advisory committees assessed directorate/office progress in

[16] The COV reports and directorate responses are available electronically as a link from the NSF GPRA web page, <http://www.nsf.gov/about/performance/>.
[17] U.S. General Accounting Office, *Program Evaluation: An Evaluation Culture and Collaborative Partnerships Help Build Agency Capacity*, GAO-03-454 (Washington, D.C.: May 2003), available at www.gao.gov/cgi-bin/getrpt?GAO-03-454.
[18] *Audit of NSF's Committees of Visitors*, OIG 03-2-013, September 25, 2003. Report is available at <http://www.nsf.gov/oig/pubs.jsp.>.

achieving NSF-wide GPRA goals. With the advent of the AC/GPA (see below), advisory committees no longer assess directorate progress toward these goals.

- **Advisory Committee for GPRA Performance Assessment (AC/GPA)** During FY 2002, NSF determined that a more efficient and effective process for the assessment of agency performance with respect to GPRA strategic goals was to charge a single external committee of experts with review of all Foundation accomplishments. That decision resulted in the chartering of a new advisory committee on July 15, 2002. The AC/GPA consists of approximately 25 external experts from various fields of science, engineering, mathematics and education. The AC/GPA looks at Foundation-wide portfolios linked to the agency's strategic outcome goals of people, ideals, tools, and organizational excellence and their associated performance indicators. In June 2004 the AC/GPA convened to assess results, using COV reports, investigator project reports, and collections of outstanding accomplishments from awards as reported by NSF program officers. This external assessment found that, overall, in FY 2004, NSF achieved all four of its strategic outcome goals. With regard to merit review, the AC/GPA found that the merit review process was "effective in the processing and review of a large volume of proposals, in the engagement of a broad and diverse segment of talent in the NSF's science and engineering enterprises, and in supporting the advancement of the frontiers of science and engineering."[19] (See also discussion above, page 22.)

- **Assessment Utilizing the Program Assessment Rating Tool (PART).** The Program Assessment Rating Tool was developed by the Office of Management and Budget (OMB) to assess program performance in four areas: Program Purpose and Design, Strategic Planning, Program Management, and Program Results / Accountability. For FY 2004 NSF worked with OMB to better integrate its GPRA and PART performance measures; this integration is reflected in NSF's FY 2005 performance budget. In February 2004, results from PART assessments were released on the "Individuals" and "Facilities" programs and on the Information Technology Research and Nanoscale Science and Engineering priority areas. All four areas were rated "effective," the highest possible rating for the PART. NSF received the top three scores of all research and development programs assessed, and all four of the NSF programs were ranked in the top 20 out of the approximately 400 programs assessed across the government that year. Each year, additional programs will be assessed for the first time and previous assessments will be updated to reflect new information and actions taken to enhance program management and results. All NSF programs and current priority areas will be assessed by the end of FY 2008.

- **Independent Verification and Validation of Performance Measurement for the Government Performance and Results Act and the Program Assessment Rating Tool.** NSF contracted with IBM Business Consulting Services to assess the validity of the data and reported results of NSF performance goals and to verify the reliability of the methods used by NSF to compile and report data for the performance measurement goals and objectives. The contractor's independent review, completed in October 2004, concluded that NSF made a concerted effort to report its performance results accurately and has effective systems,

[19] "Report of the Advisory Committee for GPRA Performance Assessment," July 2004, page 48. Available at http://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf04216.

policies, and procedures to promote data quality. The review also verified that NSF relied on sound business policies and internal controls, and maintained adequate documentation of its processes and data.[20]

Special Proposal and Grant Mechanisms

Preliminary Proposals

Some NSF programs invite the submission of preliminary proposals. The intent of preliminary proposals is to limit the burden imposed on proposers, reviewers and NSF staff. Normally, preliminary proposals require only enough information to make fair and reasonable decisions regarding encouragement/discouragement of a full proposal. Review practices for preliminary proposals range from non-binding advice from program officers to proposers to formal recommendations from external reviewers or panels.[21] In FY 2004, NSF received a total of 2,310 preliminary proposals, compared to 2,469 preliminary proposals in FY 2003 and 1,747 proposals in FY 2002.[22] For those proposals subject to non-binding advice, NSF encouraged the submission of full proposals in 544 cases and discouraged submission of a full proposal in 868 cases. For the proposals subject to binding advice through formal recommendations, NSF invited the submission of a full proposal in 221 cases, and did not invite the submission of a full proposal in 671 cases. Six preliminary proposals were withdrawn.

Small Grants for Exploratory Research (SGER)

Since the beginning of FY 1990, the Small Grants for Exploratory Research (SGER) option has permitted program officers throughout the Foundation to make small-scale grants *without formal external review*. Characteristics of activities that can be supported by an SGER award include: preliminary work on untested and novel ideas; ventures into emerging research and potentially transformative ideas; quick-response research on unanticipated events, such as natural disasters and infrequent phenomena; and similar efforts likely to catalyze rapid and innovative advances.

In an example of a quick-response project, an engineering team received an SGER award to compile wind damage data from homes affected by Hurricane Charley in Florida before the data were irretrievably lost. Similarly, NSF program officers welcomed SGER proposals following the earthquake and tsunami events in the Indian Ocean in December 2004.

Examples of preliminary work on untested and novel ideas include a project to devise silicon nanowire biological sensor arrays capable of screening unknown samples by analyzing for DNA markers of various dangerous biological species in real time. Another project is to develop a novel molecular technique for identification and quantification of waterborne pathogens.

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[20] IBM Business Consulting Services, "National Science Foundation: Government Performance and Results Act (GPRA) and Program Assessment Rating Tool (PART) Performance Measurement Validation and Verification, Report on FY 2004 Results," October 2004. Available upon request.

[21] A binding (invite/non-invite) decision is the type of mechanism used when the NSF decision made on the preliminary proposal is final, affecting the PI's eligibility to submit a full proposal. A non-binding (encourage/discourage) decision is the type of mechanism used when the NSF decision made on the preliminary proposal is advisory only. This means that submitters of both favorably and unfavorably reviewed proposals are eligible to submit full proposals (Source: NSF Proposal and Award Manual).

[22] Please note that preliminary proposals are not included in the total count of proposals received and competitively reviewed at NSF as reported on page 5, above.

Potential SGER applicants are encouraged to contact an NSF program officer before submitting an SGER proposal to determine its appropriateness for funding. Directorate-level data on SGER proposals and awards are presented in **Appendix Table 14,** page 56. In FY 2004, NSF made 382 SGER awards, compared to 344 awards in the previous year. The total amount awarded to SGERs in FY 2004 was $29,493,932, about 0.5 percent of the operating budget for research and education. Last fiscal year the total amount awarded to SGERs was $23,424,191, representing about 0.4 percent of the operating budget for research and education.

The average size of SGER award in FY 2004 was around $77,000, compared to $68,000 in FY 2003. In September 2003 NSF raised the maximum SGER award threshold from $100,000 to $200,000. Program officers may obligate no more than five percent of their program budget per fiscal year for SGER awards.

Accomplishment Based Renewals

In an accomplishment-based renewal, the project description is replaced by copies of no more than six reprints of publications resulting from the research supported by NSF (or research supported by other sources that is closely related to the NSF-supported research) during the preceding three- to five-year period. In addition, a brief (not to exceed four pages) summary of plans for the proposed support period must be submitted. All other information required for NSF proposal submission remains the same. The proposals undergo merit review in the tradition of the specific program. In 2004 there were 87 requests for accomplishment-based renewals, 40 of which were awarded.

Appendix Table 1
Competitively Reviewed Proposals, Awards and Funding Rates
By Directorate, FY 2000 – 2004

		Fiscal Year				
		2000	**2001**	**2002**	**2003**	**2004**
NSF	Proposals	29,508	31,942	35,165	40,075	43,851
	Awards	9,850	9,925	10,406	10,844	10,380
	Funding Rate	33%	31%	30%	27%	24%
BIO	Proposals	4,868	5,131	5,143	5,591	6,063
	Awards	1,430	1,431	1,400	1,448	1,432
	Funding Rate	29%	28%	27%	26%	24%
CISE	Proposals	3,022	3,866	4,540	5,612	6,496
	Awards	931	923	1,093	1,231	1,064
	Funding Rate	31%	24%	24%	22%	16%
EHR	Proposals	2,725	3,449	3,966	4,111	4,644
	Awards	950	1,157	1,044	890	925
	Funding Rate	35%	34%	26%	22%	20%
ENG	Proposals	6,022	5,983	6,883	9,076	8,994
	Awards	1,540	1,426	1,726	1,945	1,753
	Funding Rate	26%	24%	25%	21%	19%
GEO	Proposals	3,485	3,580	4,114	4,230	4,267
	Awards	1,367	1,417	1,450	1,515	1,419
	Funding Rate	39%	40%	35%	36%	33%
MPS	Proposals	5,287	5,692	5,996	6,694	7,184
	Awards	2,045	1,996	2,105	2,268	2,175
	Funding Rate	39%	35%	35%	34%	30%
SBE	Proposals	2,737	2,900	3,279	3,491	4,619
	Awards	924	942	931	894	939
	Funding Rate	34%	32%	28%	26%	20%
OPP	Proposals	675	634	572	557	689
	Awards	251	201	264	241	268
	Funding Rate	37%	32%	46%	43%	39%
OISE	Proposals	619	610	608	670	851
	Awards	344	358	334	373	386
	Funding Rate	56%	59%	55%	56%	45%
Other	Proposals	68	97	64	12	44
	Awards	68	74	59	12	19
	Funding Rate	100%	76%	92%	100%	43%

Notes:
"Competitively reviewed" proposals and awards refer to proposal actions for research, education, and training which are processed through NSF's merit review system each year.
These figures do not include 8,189 second-year and later incremental awards during FY 2004 for "continuing grants" which are competitively reviewed in the first year of the award.
Also excluded are 3,720 supplements (not subject to external merit review), and 323 contracts which are reviewed with special criteria.
"Other" organizational units include Office of Integrative Activities.

Source: NSF Enterprise Information System, as of October 2, 2004.

Appendix Table 2
Competitively Reviewed Proposals, Awards and Funding Rates
By PI Characteristics, FY 1997 - 2004

		Fiscal Year							
		1997	1998	1999	2000	2001	2002	2003	2004
All PIs	Proposals	30,258	28,422	28,578	29,508	31,942	35,165	40,075	43,851
	Awards	9,936	9,381	9,189	9,850	9,925	10,406	10,844	10,380
	Funding Rate	33%	33%	32%	33%	31%	30%	27%	24%
Female PIs	Proposals	5,396	5,627	5,315	5,509	5,839	6,704	7,335	8,427
	Awards	1,950	1,938	1,682	1,949	1,894	2,012	2,090	2,118
	Funding Rate	36%	34%	32%	35%	32%	30%	28%	25%
Male PIs	Proposals	24,532	22,513	23,022	23,671	25,510	27,500	31,238	33,300
	Awards	7,859	7,323	7,428	7,778	7,867	8,203	8,495	7,923
	Funding Rate	32%	33%	32%	33%	31%	30%	27%	24%
Minority PIs	Proposals	1,452	1,410	1,434	1,480	1,728	1,906	2,141	2,551
	Awards	448	403	424	472	509	548	569	597
	Funding Rate	31%	29%	30%	32%	29%	29%	27%	23%
New PIs	Proposals	13,276	12,255	11,803	12,327	13,280	15,085	17,584	19,052
	Awards	3,314	3,117	2,689	3,024	3,136	3,329	3,390	3,256
	Funding Rate	25%	25%	23%	25%	24%	22%	19%	17%
Prior PIs	Proposals	16,982	16,167	16,775	17,181	18,662	20,080	22,511	24,799
	Awards	6,622	6,264	6,500	6,826	6,789	7,077	7,478	7,124
	Funding Rate	39%	39%	39%	40%	36%	35%	33%	29%

Notes:

"Gender" is based on self-reported information from the PI's most recent proposal.
"Minority" is based on the PI's ethnic/racial status as reported to NSF on the most recent proposal.
PIs can decline to report their ethnic/racial status. Includes American Indian, Alaska Native, Black, Hispanic, and Pacific Islander and excludes Asian and White-Not of Hispanic Origin.

Source: NSF Enterprise Information System, October 2, 2004.

Appendix Table 3
Competitively Reviewed Proposals, Awards and Funding Rates
By Minority PI Ethnic/Racial Status, FY 1997 – 2004

		Fiscal Year							
		1997	1998	1999	2000	2001	2002	2003	2004
American	Proposals	74	61	58	90	118	100	112	93
Indian/Alaska	Awards	17	17	19	34	52	30	28	23
Native	Funding Rate	23%	28%	33%	38%	44%	30%	25%	25%
Black/	Proposals	581	541	539	522	668	748	822	900
African	Awards	190	144	146	169	180	207	192	208
American	Funding Rate	33%	27%	27%	32%	27%	28%	23%	23%
Hispanic	Proposals	762	779	807	854	955	1,041	1,191	1,432
or	Awards	230	234	245	258	285	300	342	347
Latino	Funding Rate	30%	30%	30%	30%	30%	29%	29%	24%
Native	Proposals	46	46	37	41	23	32	37	47
Hawaiian/	Awards	14	14	13	19	6	7	12	4
Pacific Island	Funding Rate	30%	30%	35%	46%	26%	22%	32%	9%

Source: NSF Enterprise Information System, as of October 2, 2004

Appendix Table 4
Median and Average Award Amounts by Directorate,
Research Awards FY 1999 - 2004

		Fiscal Year					
		1999	**2000**	**2001**	**2002**	**2003**	**2004**
NSF	Median	$70,254	$75,810	$84,387	$85,839	$100,000	$101,566
	Average	$89,776	$104,905	$113,833	$115,656	$135,609	$139,522
BIO	Median	$89,333	$99,854	$108,333	$110,000	$126,000	$133,191
	Average	$111,208	$117,378	$143,512	$136,509	$177,305	$171,074
CSE	Median	$78,284	$100,000	$95,330	$97,828	$116,193	$119,734
	Average	$106,367	$153,840	$133,250	$141,018	$160,156	$175,692
ENG	Median	$74,250	$75,000	$80,946	$83,965	$99,997	$96,677
	Average	$83,881	$87,601	$99,506	$102,060	$119,470	$119,704
GEO	Median	$65,000	$72,828	$76,667	$80,168	$102,667	$114,730
	Average	$82,120	$94,920	$98,917	$103,439	$146,475	$150,181
MPS	Median	$74,960	$75,100	$86,243	$83,319	$100,000	$100,000
	Average	$94,832	$108,804	$114,421	$111,617	$128,585	$130,043
SBE	Median	$50,906	$52,778	$63,377	$62,950	$77,388	$77,948
	Average	$65,521	$60,538	$80,709	$78,035	$89,488	$90,373
OPP	Median	$80,000	$72,729	$77,789	$81,517	$126,143	$141,452
	Average	$115,209	$141,221	$113,164	$130,343	$144,392	$204,126
OISE	Median	$7,605	$7,939	$8,784	$9,800	$10,000	$10,000
	Average	$11,960	$14,193	$17,429	$16,441	$20,869	$15,003

Source: NSF Enterprise Information System, as of November 13, 2004.

Appendix Table 5
Methods of NSF Proposal Review
FY 1993 – 2004

	Total	Mail + Panel		Mail-Only		Panel-Only		Not Reviewed	
FY	Proposals	Proposals	Percent	Proposals	Percent	Proposals	Percent	Proposals	Percent
2004	43,851	13,345	31%	4,496	10%	24,553	56%	1,457	3%
2003	40,075	12,683	32%	4,579	11%	21,391	53%	1,388	3%
2002	35,164	11,346	32%	4,838	14%	17,616	50%	1,364	4%
2001	31,942	9,367	29%	5,460	17%	15,751	49%	1,364	4%
2000	29,507	9,296	32%	6,048	20%	12,886	44%	1,277	4%
1999	28,579	8,918	31%	6,452	23%	12,046	42%	1,163	4%
1998	28,422	8,486	30%	6,974	25%	11,396	40%	1,566	6%
1997	30,258	8,812	29%	7,855	26%	12,109	40%	1,482	5%
1996	30,199	8,562	28%	7,812	26%	12,490	41%	1,335	4%
1995	30,432	8,400	28%	8,581	28%	11,912	39%	1,539	5%
1994	30,336	7,059	23%	8,687	29%	12,986	43%	1,604	5%
1993	30,038	7,032	23%	8,886	30%	12,338	41%	1,782	6%

Note:
Panel-Only includes cases where panel was mailed proposal for review prior to panel.

Source: NSF Enterprise Information System, as of January 6, 2005.

Appendix Table 6
Methods of NSF Proposal Review, By Directorates
FY 2004

	Total	Mail + Panel		Mail-Only		Panel-Only		Not Reviewed	
Directorate	Proposals	Proposals	Percent	Proposals	Percent	Proposals	Percent	Proposals	Percent
NSF	**43,851**	**13,345**	**31%**	**4,496**	**10%**	**24,553**	**56%**	**1,457**	**3%**
BIO	6,063	4,611	76%	72	1%	1,171	19%	209	3%
CSE	6,496	359	6%	90	1%	5,881	91%	166	3%
EHR	4,644	75	2%	146	3%	4,368	94%	55	1%
ENG	8,994	474	5%	572	6%	7,606	85%	342	4%
GEO	4,267	3,255	76%	626	15%	210	5%	176	4%
MPS	7,184	1,665	23%	1,932	27%	3,316	46%	271	4%
SBE	4,619	2,590	56%	194	4%	1,778	38%	57	1%
OPP	689	275	40%	323	47%	45	7%	46	7%
OISE	851	16	2%	537	63%	178	21%	120	14%
Other	44	25	57%	4	9%	0	0%	15	34%

Note:
Panel-Only includes cases where panelist was mailed proposal for review prior to panel.

Source: NSF Enterprise Information System, as of October 2, 2004.

Appendix Table 7
Average Number of Reviews per Proposal
By Method & Directorate, FY 2004

		Methods of Review						
		All Methods	Mail + Panel	Mail-Only	Panel-Only	Not Reviewed*	Returned without Review	Withdrawn Proposals
NSF	Reviews	254,490	102,427	19,021	133,042			
	Proposals	42,394	13,345	4,496	24,553	1,457	3,986	5,756
	Rev/Prop	6.0	7.7	4.2	5.4			
BIO	Reviews	35,912	30,647	317	4,948			
	Proposals	5,854	4,611	72	1,171	209	1,558	1,218
	Rev/Prop	6.1	6.6	4.4	4.2			
CSE	Reviews	33,226	2,364	348	30,514			
	Proposals	6,330	359	90	5,881	166	220	704
	Rev/Prop	5.2	6.6	3.9	5.2			
EHR	Reviews	29,014	477	476	28,061			
	Proposals	4,589	75	146	4,368	55	282	468
	Rev/Prop	6.3	6.4	3.3	6.4			
ENG	Reviews	45,009	3,023	2,549	39,437			
	Proposals	8,652	474	572	7,606	342	1,152	960
	Rev/Prop	5.2	6.4	4.5	5.2			
GEO	Reviews	39,192	34,573	3,079	1,540			
	Proposals	4,091	3,255	626	210	176	88	610
	Rev/Prop	9.6	10.6	4.9	7.3			
MPS	Reviews	39,790	12,241	8,399	19,150			
	Proposals	6,913	1,665	1,932	3,316	271	432	1,105
	Rev/Prop	5.8	7.4	4.3	5.8			
SBE	Reviews	25,880	16,627	744	8,509			
	Proposals	4,562	2,590	194	1,778	57	118	409
	Rev/Prop	5.7	6.4	3.8	4.8			
OPP	Reviews	3,699	2,123	1,334	242			
	Proposals	643	275	323	45	46	2	78
	Rev/Prop	5.8	7.7	4.1	5.4			
OISE	Reviews	2,516	115	1,760	641			
	Proposals	731	16	537	178	120	68	154
	Rev/Prop	3.4	7.2	3.3	3.6			
Other	Reviews	252	237	15	0			
	Proposals	29	25	4	0	15	66	50
	Rev/Prop	8.7	9.5	3.8	N/A			

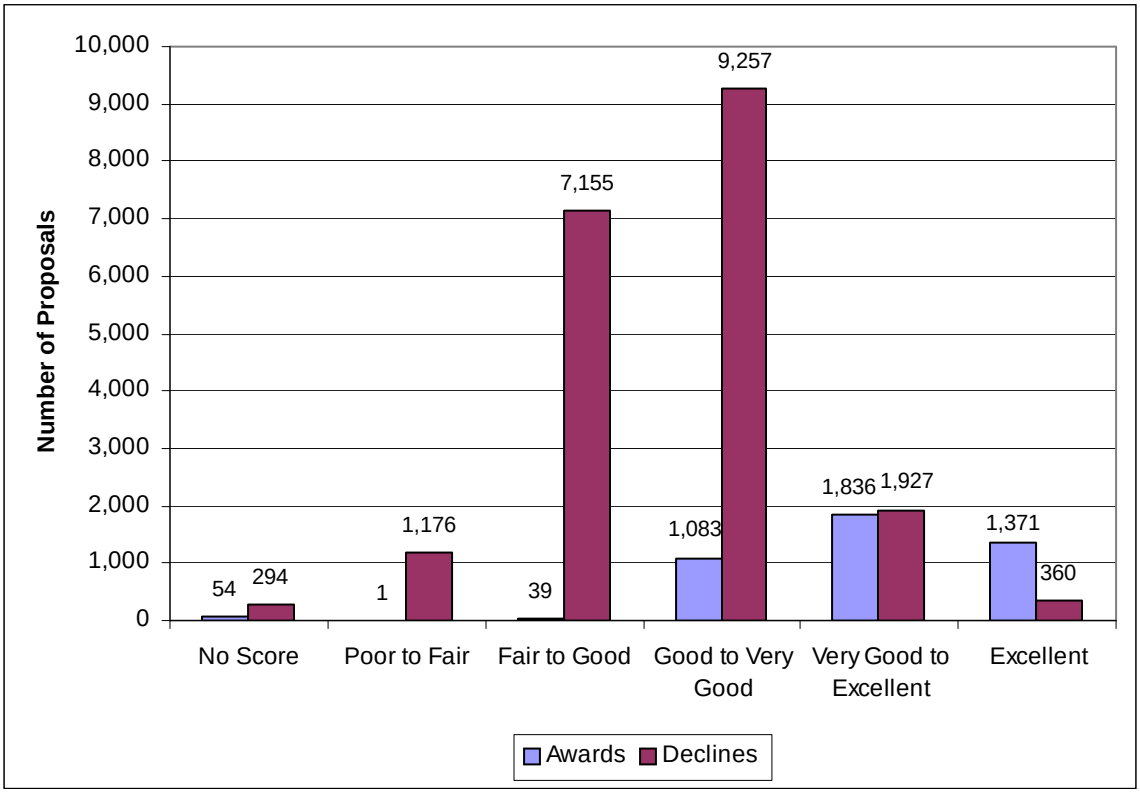
Notes:
* The proposal totals shown in the "All Methods" category do not include the proposals shown in the "Not Reviewed" category. Proposals which are not externally reviewed include SGERs and grants for travel and symposia.

Panel reviews include panel summaries. There were 39,421 panel summaries in FY 2004.

Peers participating as both a mail and a panel reviewer for the same proposal are counted as one review in this table.

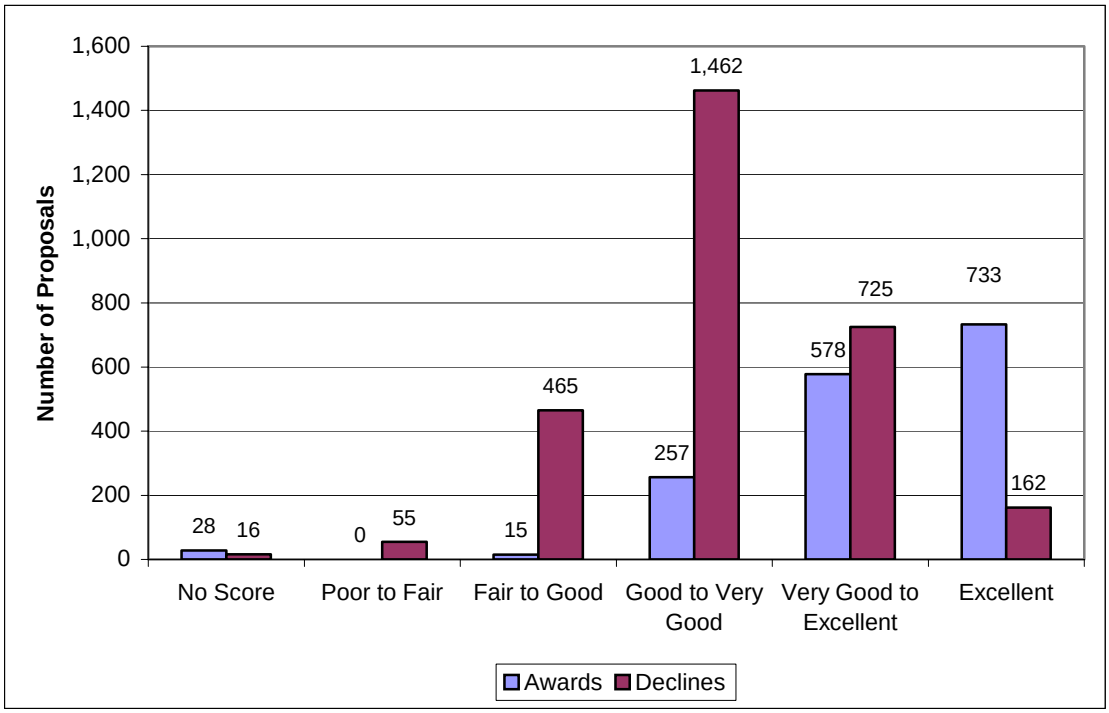
Source: NSF Enterprise Information System, as of October 2, 2004

Appendix Table 8
Distribution of Average Reviewer Ratings
Panel-Only Reviewed



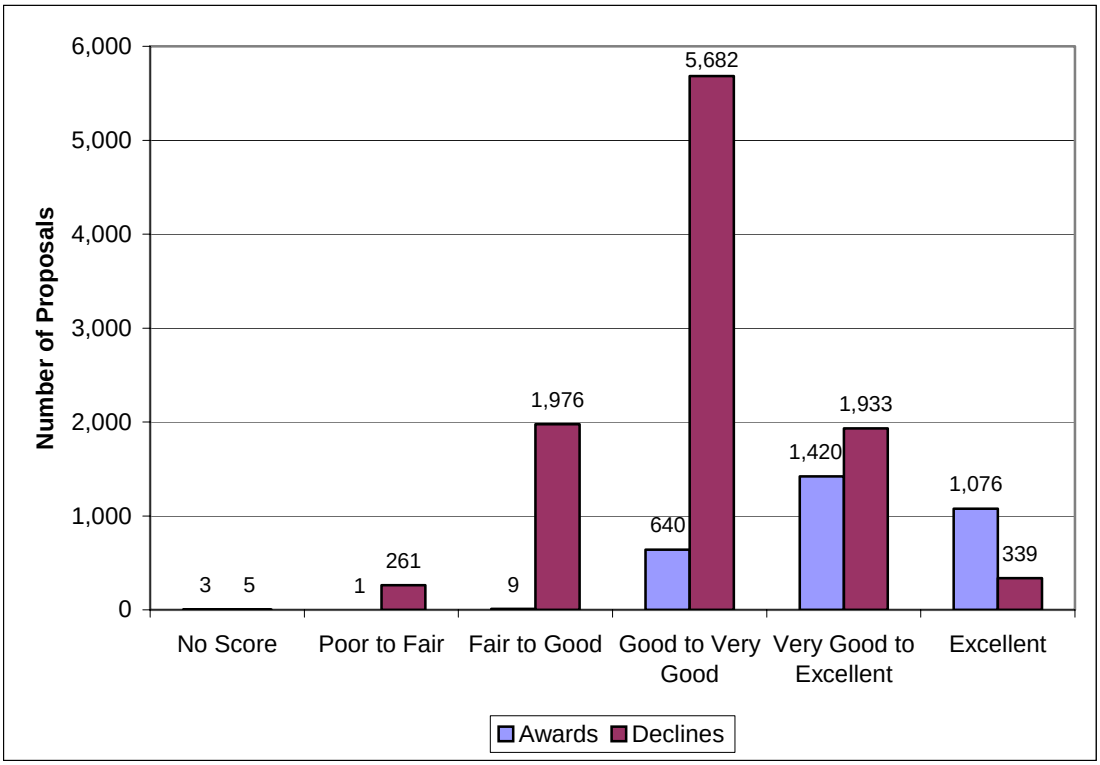
Note:
Number of FY 2004 Proposals – 20,169 Declines, 4,384 Awards

Appendix Table 9
Distribution of Average Reviewer Ratings,
Mail-Only Reviewed



Note:
Number of FY 2004 Proposals – 2,885 Declines, 1,611 Awards

Appendix Table 10
Distribution of Average Reviewer Ratings
Mail and Panel Reviewed



Note:
Number of FY 2004 Proposals – 10,196 Declines, 3,149 Awards

Appendix Table 11
Requests for Formal Reconsideration of Declined Proposals
By Directorate, FY 2000-2004

		Fiscal Year				
		2000	**2001**	**2002**	**2003**	**2004**
First Level Reviews (by Assistant Directors):						
BIO	Request	0	8	4	4	3
	- Upheld	0	6	4	4	3
	- Reversed	0	2	0	0	0
CISE	Request	2	1	1	1	2
	- Upheld	1	1	0	0	2
	- Reversed	0	0	0	1	0
EHR	Request	4	4	2	3	2
	- Upheld	4	3	2	3	2
	- Reversed	0	1	0	0	0
ENG	Request	6	1	2	2	3
	- Upheld	6	1	2	2	3
	- Reversed	0	0	0	0	0
GEO	Request	2	2	1	4	4
	- Upheld	2	2	1	4	4
	- Reversed	0	0	0	0	0
MPS	Request	18	24	15	4	24
	- Upheld	17	22	15	4	24
	- Reversed	1	2	0	0	0
SBE	Request	1	2	1	2	3
	- Upheld	1	1	0	2	3
	- Reversed	0	1	1	0	0
Other	Request	0	0	0	1	1
	- Upheld	0	0	0	0	0
	- Reversed	0	0	0	1	1
Second Level Reviews (by Deputy Director):						
O/DD	Request	6	2	4	5	7
	- Upheld	5	1	4	4	7
	- Reversed	1	0	0	1	0
Total Reviews First & Second Level						
NSF	**Request**	**39**	**44**	**30**	**26**	**49**
	- Upheld	**36**	**37**	**29**	**24**	**48**
	- Reversed	**2**	**6**	**1**	**2**	**1**

Note:
The number of decisions (upheld or reversed) may not equal the number of requests in each year due to carryover of pending reconsideration request.

Source: Office of the Director

Appendix Table 12

CORE QUESTIONS and REPORT TEMPLATE for FY 2004 NSF COMMITTEE OF VISITOR (COV) REVIEWS

Guidance to NSF Staff: This document includes the FY 2004 set of Core Questions and the COV Report Template for use by NSF staff when preparing and conducting COVs during FY 2004. Specific guidance for NSF staff describing the COV review process is described in Subchapter 300-Committee of Visitors Reviews (NSF Manual 1, Section VIII) that can be obtained at http://www.nsf.gov/about/performance/index.jsp.

NSF relies on the judgment of external experts to maintain high standards of program management, to provide advice for continuous improvement of NSF performance, and to ensure openness to the research and education community served by the Foundation. Committee of Visitor (COV) reviews provide NSF with external expert judgments in two areas: (1) assessments of the quality and integrity of program operations and program-level technical and managerial matters pertaining to proposal decisions; and (2) comments on how the outputs and outcomes generated by awardees have contributed to the attainment of NSF's mission and strategic outcome goals.

Many of the Core Questions are derived from NSF performance goals and apply to the portfolio of activities represented in the program(s) under review. The program(s) under review may include several subactivities as well as NSF-wide activities. The directorate or division may instruct the COV to provide answers addressing a cluster or group of programs – a portfolio of activities integrated as a whole – or to provide answers specific to the subactivities of the program, with the latter requiring more time but providing more detailed information.

The Division or Directorate may choose to add questions relevant to the activities under review. NSF staff should work with the COV members in advance of the meeting to provide them with the report template, organized background materials, and to identify questions/goals that apply to the program(s) under review.

Guidance to the COV: The COV report should provide a balanced assessment of NSF's performance in two primary areas: (A) the integrity and efficiency of the ***processes*** related to proposal review; and (B) the quality of the ***results*** of NSF's investments in the form of outputs and outcomes that appear over time. The COV also explores the relationships between award decisions and program/NSF-wide goals in order to determine the likelihood that the portfolio will lead to the desired results in the future. Discussions leading to answers for Part A of the Core Questions will require study of confidential material such as declined proposals and reviewer comments. *COV reports should not contain confidential material or specific information about declined proposals.* Discussions leading to answers for Part B of the Core Questions will involve study of non-confidential material such as results of NSF-funded projects. It is important to recognize that the reports generated by COVs are used in assessing agency progress in order to meet government-wide performance reporting requirements, and are made available to the public. Since material from COV reports is used in NSF performance reports, the COV report may be subject to an audit.

We encourage COV members to provide comments to NSF on how to improve in all areas, as well as suggestions for the COV process, format, and questions.

Appendix Table 12 (cont.)

FY 2004 REPORT TEMPLATE FOR
NSF COMMITTEES OF VISITORS (COVs)

Date of COV
Program/Cluster:
Division:
Directorate:
Number of actions reviewed by COV[23]: Awards: Declinations: Other:
Total number of actions within Program/Cluster/Division during period being reviewed by COV[24]: Awards: Declinations: Other:
Manner in which reviewed actions were selected:

PART A. INTEGRITY AND EFFICIENCY OF THE PROGRAM'S PROCESSES AND MANAGEMENT

Briefly discuss and provide comments for *each* relevant aspect of the program's review process and management. Comments should be based on a review of proposal actions (awards, declinations, and withdrawals) that were *completed within the past three fiscal years*. Provide comments for *each* program being reviewed and for those questions that are relevant to the program under review. Quantitative information may be required for some questions. Constructive comments noting areas in need of improvement are encouraged.

A.1 Questions about the quality and effectiveness of the program's use of merit review procedures. Provide comments in the space below the question. Discuss areas of concern in the space provided.

QUALITY AND EFFECTIVENESS OF MERIT REVIEW PROCEDURES	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE[25]
Is the review mechanism appropriate? (panels, ad hoc reviews, site visits) Comments:	
Is the review process efficient and effective? Comments:	

[23] To be provided by NSF staff.
[24] To be provided by NSF staff.
[25] If "Not Applicable" please explain why in the "Comments" section.

Appendix Table 12 (cont.)

Are reviews consistent with priorities and criteria stated in the program's solicitations, announcements, and guidelines? Comments:	
Do the individual reviews (either mail or panel) provide sufficient information for the principal investigator(s) to understand the basis for the reviewer's recommendation? Comments:	
Do the panel summaries provide sufficient information for the principal investigator(s) to understand the basis for the panel recommendation? Comments:	
Is the documentation for recommendations complete, and does the program officer provide sufficient information and justification for her/his recommendation? Comments:	
Is the time to decision appropriate? Comments:	
Discuss issues identified by the COV concerning the quality and effectiveness of the program's use of merit review procedures:	

A.2 Questions concerning the implementation of the NSF Merit Review Criteria (intellectual merit and broader impacts) by reviewers and program officers. Provide comments in the space below the question. Discuss issues or concerns in the space provided.

IMPLEMENTATION OF NSF MERIT REVIEW CRITERIA	**YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE[26]**
Have the individual reviews (either mail or panel) addressed whether the proposal contributes to both merit review criteria? Comments:	

[26] In "Not Applicable" please explain why in the "Comments" section.

Appendix Table 12 (cont.)

Have the panel summary reviews addressed whether the proposal contributes to both merit review criteria? Comments:	
Have the *review analyses* (Form 7s) addressed whether the proposal contributes to both merit review criteria? Comments:	
Discuss any issues or concerns the COV has identified with respect to NSF's merit review system.	

A.3 Questions concerning the selection of reviewers. Provide comments in the space below the question. Discuss areas of concern in the space provided.

SELECTION OF REVIEWERS	**YES , NO, DATA NOT AVAILABLE, or NOT APPLICABLE[27]**
Did the program make use of an adequate number of reviewers for a balanced review? Comments:	
Did the program make use of reviewers having appropriate expertise and/or qualifications? Comments:	
Did the program make appropriate use of reviewers to reflect balance among characteristics such as geography, type of institution, and underrepresented groups? Comments:	
Did the program recognize and resolve conflicts of interest when appropriate? Comments:	
Discuss any concerns identified that are relevant to selection of reviewers.	

A.4 Questions concerning the resulting portfolio of awards under review. Provide comments in the space below the question. Discuss areas of concern in the space provided.

[27] If "Not Applicable" please explain why in the "Comments" section.

Appendix Table 12 (cont.)

RESULTING PORTFOLIO OF AWARDS	APPROPRIATE, NOT APPROPRIATE[28], OR DATA NOT AVAILABLE
Overall quality of the research and/or education projects supported by the program. Comments:	
Are awards appropriate in size and duration for the scope of the projects? Comments:	
Does the program portfolio have an appropriate balance of: • High Risk Proposals? Comments:	
Does the program portfolio have an appropriate balance of: • Multidisciplinary Proposals? Comments:	
Does the program portfolio have an appropriate balance of: • Innovative Proposals? Comments:	
Does the program portfolio have an appropriate balance of: • Funding for centers, groups and awards to individuals? Comments:	
Does the program portfolio have an appropriate balance of: • Awards to new investigators? Comments:	
Does the program portfolio have an appropriate balance of: • Geographical distribution of Principal Investigators? Comments:	
Does the program portfolio have an appropriate balance of: • Institutional types? Comments:	

[28] If "Not Appropriate" please explain why in the "Comments" section.

Appendix Table 12 (cont.)

Does the program portfolio have an appropriate balance of: • Projects that integrate research and education? Comments:	
Does the program portfolio have an appropriate balance: • Across disciplines and subdisciplines of the activity and of emerging opportunities? Comments:	
Does the program portfolio have appropriate participation of underrepresented groups? Comments:	
Is the program relevant to national priorities, agency mission, relevant fields and other customer needs? Include citations of relevant external reports. Comments:	
Discuss any concerns identified that are relevant to the quality of the projects or the balance of the portfolio.	

A.5 Management of the program under review. Please comment on:

Management of the program. Comments:
Responsiveness of the program to emerging research and education trends. Comments:
Program planning and prioritization process (internal and external) that guided the development of the portfolio under review. Comments:
Discuss any concerns identified that are relevant to the management of the program.

Appendix Table 12 (cont.)

PART B. RESULTS : OUTPUTS AND OUTCOMES OF NSF INVESTMENTS

NSF investments produce results that appear over time. The answers to the first three (People, Ideas and Tools) questions in this section are to be based on the COV's study of award results, which are direct and indirect accomplishments of projects supported by the program. These projects may be currently active or closed out during the previous three fiscal years. The COV review may also include consideration of significant impacts and advances that have developed since the previous COV review and are demonstrably linked to NSF investments, regardless of when the investments were made. Incremental progress made on results reported in prior fiscal years may also be considered.

The following questions are developed using the NSF outcome goals in the NSF Strategic Plan. The COV should look carefully at and comment on (1) noteworthy achievements of the year based on NSF awards; (2) the ways in which funded projects have collectively affected progress toward NSF's mission and strategic outcomes; and (3) expectations for future performance based on the current set of awards. NSF asks the COV to provide comments on the degree to which past investments in research and education have contributed to NSF's progress towards its annual strategic outcome goals and to its mission:

- To promote the progress of science.
- To advance national health, prosperity, and welfare.
- To secure the national defense.
- And for other purposes.

Excellence in managing NSF underpins all of the agency's activities. For the response to the Outcome Goal for Organizational Excellence, the COV should comment, where appropriate, on NSF providing an agile, innovative organization. Critical indicators in this area include (1) operation of a credible, efficient merit review system; (2) utilizing and sustaining broad access to new and emerging technologies for business application; (3) developing a diverse, capable, motivated staff that operates with efficiency and integrity; and (4) developing and using performance assessment tools and measures to provide an environment of continuous improvement in NSF's intellectual investments as well as its management effectiveness.

B. Please provide comments on the activity as it relates to NSF's Strategic Outcome Goals. Provide examples of outcomes (nuggets) as appropriate. Examples should reference the NSF award number, the Principal Investigator(s) names, and their institutions.

B.1 <u>OUTCOME GOAL for PEOPLE</u>: Developing "a diverse, competitive and globally engaged workforce of scientists, engineers, technologists and well-prepared citizens." Comments:
B.2 <u>OUTCOME GOAL for IDEAS</u>: Enabling "discovery across the frontier of science and engineering, connected to learning, innovation, and service to society." Comments:

Appendix Table 12 (cont.)

B.3 <u>OUTCOME GOAL for TOOLS:</u> Providing "broadly accessible, state-of-the-art S&E facilities, tools and other infrastructure that enable discovery, learning and innovation." Comments:
B.4 <u>OUTCOME GOAL for ORGANIZATIONAL EXCELLENCE</u>: Providing "an agile, innovative organization that fulfills its mission through leadership in state-of-the-art business practices." Comments:

PART C. OTHER TOPICS

C.1 Please comment on any program areas in need of improvement or gaps (if any) within program areas.

C.2 Please provide comments as appropriate on the program's performance in meeting program-specific goals and objectives that are not covered by the above questions.

C.3 Please identify agency-wide issues that should be addressed by NSF to help improve the program's performance.

C.4 Please provide comments on any other issues the COV feels are relevant.

C.5 NSF would appreciate your comments on how to improve the COV review process, format and report template.

SIGNATURE BLOCK:

_____

For the [Replace with Name of COV]
[Name of Chair of COV]
Chair

Appendix Table 13

Committee of Visitors Meetings
By Directorate

(COV meetings held during FY 2004 are highlighted in bold)

DIRECTORATE *Division* Program or Cluster	Fiscal Year of Most Recent COV	Fiscal Year of Next COV
BIOLOGICAL SCIENCES		
Biological Infrastructure	**2004**	2007
Research Resources (includes former Instrument-Related Activities)	**2004**	2007
Human Resources (includes former Training Cluster)	**2004**	2007
Plant Genome Research Program	**2004**	2007
Environmental Biology	2003	2006
Ecological Biology (Ecol. Studies held COV in 2002)	2002	2006
Ecosystem Science (Thematic Review held COV in 2001)	2001	2006
Population and Evolutionary Processes (Systematic and Population Biology held COV in 2000)	2000	2006
Systematic Biology and Biodiversity Inventories		2006
Integrative Organismal Biology(formerly Int. Biology and Neuroscience)	2005	2008
Behavioral Systems	2005	2008
Developmental Systems	2005	2008
Environmental and Structural Systems	2005	2008
Functional and Regulatory Systems	2005	2008
Molecular and Cellular Biosciences	2005	2008
Biomolecular Systems (formerly Biomolecular Structure and Function and Biomolecular Processes)	2005	2008
Cellular Systems (formerly Cell Biology)	2005	2008
Genes and Genome Systems (formerly Genetics)	2005	2008
Emerging Frontiers (new in '03)	N/A	2006

Appendix Table 13 (cont.)

COMPUTER AND INFORMATION SCIENCE AND ENGINEERING Please note that CISE programs and divisions were reorganized in FY 2003. COVs for IIS, ANIR, and CCR were held in FY 2003.		2006
Computing & Communication Foundations (CCF)		
Emerging Models & Technologies for Computation		2006
Formal & Mathematical Foundations		2006
Foundations of Computing Processes & Artifacts		2006
Computer & Network Systems (CNS)		2006
Computer Systems		2006
Computing Research Infrastructure		2006
Education & Workforce		2006
Network Systems		2006
Information & Intelligent Systems (IIS)		2006
Data, Inference & Understanding		2006
Science & Engineering Informatics		2006
Systems in Context		2006
Shared Cyberinfrastructure (SCI)	2005	2008

Appendix Table 13 (cont.)

EDUCATION AND HUMAN RESOURCES		
Educational Systemic Reform (discontinued)		
Statewide Systemic Initiatives	**2004**	
Urban Systemic Initiatives	**2004**	
Rural Systemic Initiatives	**2004**	
Office of Innovation Partnerships		
EPSCoR	2005	2008
Elementary, Secondary and Informal Education		
Informal Science Education	2005	2008
Teacher Enhancement	2003	2006
Instructional Materials Development	2005	2008
Centers for Learning and Teaching (new in ’01)	**2004**	2007
Undergraduate Education		
Teacher Preparation	**2004**	2007
Advanced Technological Education	2003	2006
NSF Computer, Science, Engineering and Mathematics		
Scholarships (new in ’01)	2003	2006
Distinguished Teaching Scholars (new in ’02)	2005	2008
Scholarship for Service (new in ’01)	2004	2007
National SMETE Digital Library (new in ’01)	2005	2008
Course, Curriculum, and Laboratory Improvement	2003	2006
Undergraduate Assessment (new in ’02)	2003	2006
The STEM Talent Expansion Program (STEP) (new in ’02)	2005	2008
Robert Noyce Scholarship (new in ’02)	2005	
Graduate Education		
Graduate Research Fellowships	2003	2006
NATO Post doctorate Fellowships (program discontinued)	**2004**	
IGERT (new in ’97)	2005	2008
GK-12 Fellows (new in ’99)	2005	2008
Human Resource Development		
The Louis Stokes Alliances for Minority Participation	2005	2008
Centers for Research Excellence in Science and Technology (CREST)	2005	2008
Gender Diversity in STEM Education	2003	2006
Programs for Persons with Disabilities (PPD)	2003	2006
Alliances for Graduate Education and the Professoriate (AGEP)	2005	2008
Tribal Colleges Program (TCP) (new in ’01)	**2004**	2007
Historically Black Colleges and Universities (HBCU)	2005	2008
Research, Evaluation & Communications		
Research on Learning and Education (ROLE)	2005	2008

Appendix Table 13 (cont.)

Evaluation	2004	2007
Interagency Education Research Initiative (IERI) (new in ’01)	2005	2008
Other		
H-IB VISA K-12	2005	
Math and Science Partnership (MSP) (new in ’02)	2005	

ENGINEERING		
Nano Science and Engineering (NS&E)		2007
Bioengineering and Environmental Systems	2005	2008
Biochemical Engineering & Biotechnology	2005	2008
Biomedical Engineering & Research to Aid Persons with Disabilities	2005	2008
Environmental Engineering & Technology	2005	2008
Civil and Mechanical Systems	2004	2007
Dynamic System Modeling, Sensing and Control	**2004**	2007
Geotechnical and GeoHazard Systems	**2004**	2007
Infrastructure and Information Systems	**2004**	2007
Solid Mechanics and Materials Engineering	**2004**	2007
Structural Systems and Engineering	**2004**	2007
Network for Earthquake Engineering Simulation	**2004**	2007
Chemical and Transport Systems		2006
Chemical Reaction Processes	2003	2006
Interfacial, Transport and Separation Processes	2003	2006
Fluid and Particle Processes	2003	2006
Thermal Systems	2003	2006
Design, Manufacture and Industrial Innovation		
-Engineering Decision Systems Programs (new in ’02)	2003	2006
Engineering Design	2003	2006
Manufacturing Enterprise Systems (new in ’02)	2003	2006
Service Enterprise Systems (new in ’02)	2003	2006
Operations Research	2003	2006
-Manufacturing Processes and Equipment Systems	2003	2006
Materials Processing and Manufacturing	2003	2006
Manufacturing Machines and Equipment	2003	2006
Nanomanufacturing (new in ’02)	2003	2006

Appendix Table 13 (cont.)

-Small Business		
Small Business Innovation Research (SBIR)	**2004**	2007
Small Business Technology Transfer	**2004**	2007
-Crosscutting		
Grant Opportunities for Academic Liaison w/ Industry	2003	2006
Innovation and Organizational Change	2003	2006
Electrical and Communications Systems		
Electronics, Photonics and Device Technologies	2005	2008
Control, Networks, and Computational Intelligence	2005	2008
Integrative Systems (new in ’02)	2005	2008
Engineering, Education and Centers		
Engineering Education	**2004**	2007
Engineering Research Centers	**2004**	2007
Industry/University Cooperative Research Centers	**2004**	2007
Partnerships for Innovation (new in ’01)	**2004**	2007

Appendix Table 13 (cont.)

GEOSCIENCES		
Atmospheric Sciences		
-Lower Atmosphere Research Section		
Atmospheric Chemistry	**2004**	2007
Climate Dynamics	**2004**	2007
Mesoscale Dynamic Meteorology	**2004**	2007
Large-scale Dynamic Meteorology	**2004**	2007
Physical Meteorology	**2004**	2007
Paleoclimate	**2004**	2007
-Upper Atmosphere Research Section		
Magnetospheric Physics	2002	2005
Aeronomy	2002	2005
Upper Atmospheric Research Facilities	2002	2005
Solar Terrestrial Research	2002	2005
-UCAR and Lower Atmospheric Facilities Oversight Section		
Lower Atmospheric Observing Facilities	2003	2006
UNIDATA	2003	2006
NCAR/UCAR	2003	2006
Earth Sciences		
Instrumentation and Facilities	**2004**	2007
-Research Support		
Tectonics	2005	2008
Geology and Paleontology	2005	2008
Hydrological Sciences	2005	2008
Petrology and Geochemistry	2005	2008
Geophysics	2005	2008
Continental Dynamics	2005	2008
Ocean Sciences		
-Integrative Programs Section		
Oceanographic Technical Services	2005	2008
Ship Operations	2005	2008
Oceanographic Instrumentation	2005	2008
Ship Acquisitions and Upgrades (new in ’02)	2005	2008
Shipboard Scientific Support Equipment (new in ’02)	2005	2008
Oceanographic Tech and Interdisciplinary Coordination	2003	2006
Ocean Science Education and Human Resources	2003	2006
-Marine Geosciences Section		
Marine Geology and Geophysics	2003	2006
Ocean Drilling	2003	2006

Appendix Table 13 (cont.)

-Ocean Section		
Chemical Oceanography	2003	2006
Physical Oceanography	2003	2006
Biological Oceanography	2003	2006
Other Programs		
Global Learning and Observation to Benefit the Environment	2003	2006
Opportunities to Enhance Diversity in the Geosciences	2003	2006
Geoscience Education	2003	2006

MATHEMATICAL AND PHYSICAL SCIENCES		
Astronomical Sciences	2005	2008
Planetary Astronomy	2005	2008
Stellar Astronomy and Astrophysics	2005	2008
Galactic Astronomy	2005	2008
Education, Human Resources and Special Programs	2005	2008
Advanced Technologies and Instrumentation	2005	2008
Electromagnetic Spectrum Management	2005	2008
Extragalactic Astronomy and Cosmology	2005	2008
-Facilities Cluster		
Gemini Observatory	2005	2008
National Radio Astronomy Observatory (NRAO)	2005	2008
National Optical Astronomy Observatories (NOAO)	2005	2008
National Solar Observatory (NSO)	2005	2008
National Astronomy and Ionosphere Center (NAIC)	2005	2008
Atacama Large Millimeter Array (ALMA)	2005	2008
Chemistry	**2004**	2007
Analytical & Surface Chemistry	**2004**	2007
Chemistry Research Instrumentation and Facilities	**2004**	2007
Collaborative Research in Chemistry	**2004**	2007
Inorganic, Bioinorganic and Organometallic Chemistry	**2004**	2007
Organic & Macromolecular Chemistry	**2004**	2007
Physical Chemistry	**2004**	2007
Undergraduate Research Centers (pilot program, new in ‘04)		2007
Materials Research	2005	2008
-Base Science Cluster		
Condensed Matter Physics	2005	2008
Solid-State Chemistry	2005	2008
Polymers	2005	2008

Appendix Table 13 (cont.)

-Advanced Materials and Processing Cluster		
Metals	2005	2008
Ceramics	2005	2008
Electronic Materials	2005	2008
-Materials Research and Technology Enabling Cluster		
Materials Theory	2005	2008
Instrumentation for Materials Research	2005	2008
National Facilities	2005	2008
Materials Research Science and Engineering Centers	2005	2008
-Office of Special Programs (new in ’03)	N/A	2008
Mathematical Sciences	**2004**	2007
Applied Mathematics	**2004**	2007
Geometric Analysis, Topology and Foundations	**2004**	2007
Computational Mathematics	**2004**	2007
Infrastructure	**2004**	2007
Analysis	**2004**	2007
Algebra, Number Theory, and Combinatorics	**2004**	2007
Statistics and Probability	**2004**	2007
Mathematical Biology (new in ‘04)		2007
Physics		
Atomic, Molecular, Optical and Plasma Physics	2003	2006
Elementary Particle Physics	2003	2006
Theoretical Physics	2003	2006
Particle and Nuclear Astrophysics (new in ’00)	2003	2006
Nuclear Physics	2003	2006
Biological Physics (new in ’03)		2006
Physics at the Information Frontier (new in ’03)		2006
Physics Frontier Centers (new in ’02)		2006
Education and Interdisciplinary Research (new in ’00)	2003	2006
Gravitational Physics	2003	2006
Office of MultidisciplinaryResearch	2003	2006

Appendix Table 13 (cont.)

SOCIAL, BEHAVIORAL, AND ECONOMIC SCIENCES	Last COV	Next COV
Office of International Science and Engineering (INT)	2005	2008
Science Resource Statistics (SRS)		
All programs	Several	2006
Behavioral and Cognitive Sciences (BCS)		
Cultural Anthropology	2003	2006
Linguistics	2003	2006
Social Psychology	2003	2006
Physical Anthropology	2003	2006
Geography and Regional Sciences	2003	2006
Cognitive Neuroscience (new in ’01)	2003	2006
Developmental and Learning Sciences (formally Child Learning & Development)	2003	2006
Perception, Action, and Cognition (formally Human Cognition & Perception)	2003	2006
Archaeology	2003	2006
Archaeometry (formally part of Archaeology)	2003	2006
Environmental Social and Behavioral Science (new in ’99)	2003	2006
Social and Economic Sciences (SES)		
Decision, Risk, and Management Sciences	**2004**	2007
Political Science	**2004**	2007
Law and Social Science	**2004**	2007
Innovation and Organizational Change	**2004**	2007
Methodology, Measurement and Statistics	**2004**	2007
Science and Technology Studies	**2004**	2007
Societal Dimensions of Engineering, Science, and Technology	**2004**	2007
Economics	**2004**	2007
Sociology	**2004**	2007
ADVANCE (Cross-Directorate Program, new in FY01/FY02)	2005	2008
Science of Learning Centers (new in FY03/FY04)		2007
Human and Social Dynamics (new in FY04)		2008

Appendix Table 13 (cont.)

OFFICE OF POLAR PROGRAMS	Last COV	Next COV
Polar Research Support	**2004**	2007
Antarctic Sciences	2003	2006
Antarctic Aeronomy and Astrophysics	2003	2006
Antarctic Biology and Medicine	2003	2006
Antarctic Geology and Geophysics	2003	2006
Antarctic Glaciology	2003	2006
Antarctic Ocean and Climate Systems	2003	2006
Arctic Sciences		
Arctic Research Support and Logistics	2003	2006
Arctic System Sciences	2003	2006
Arctic Natural Sciences	2003	2006
Arctic Social Sciences	2003	2006

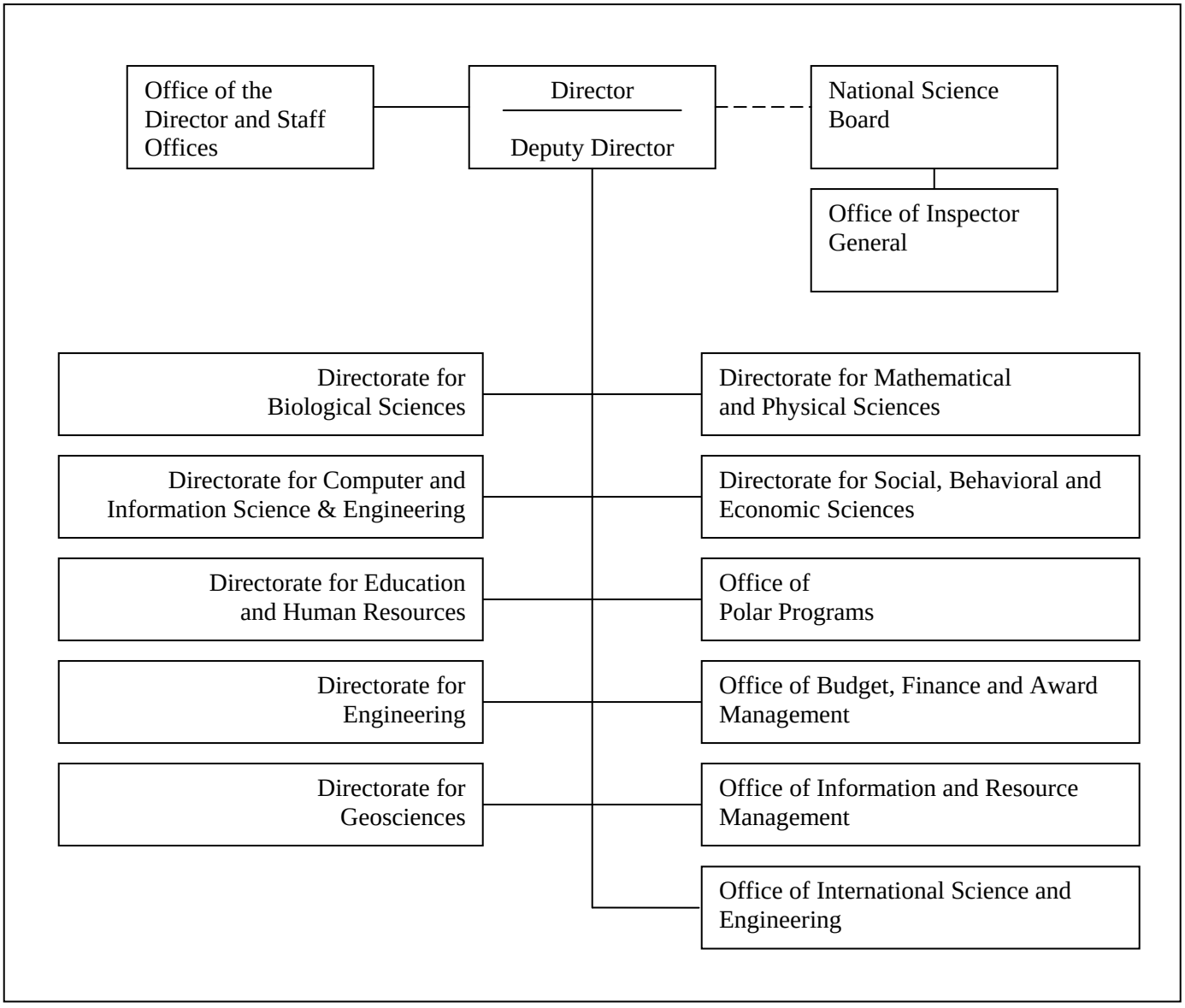
OFFICE OF INTEGRATIVE ACTIVITIES		
Major Research Instrumentation (MRI)	2000*	2005
Science and Technology Centers (STC)	1996*	2007
*External Evaluations		

NSF PRIORITY AREAS AND CROSSCUTTING PROGRAMS	Last COV	Next COV
Nanoscale Science and Engineering Priority Area	**2004**	2007
Biocompexity in the Environment	**2004**	2007
CAREER	2005	2009
Information Technology Research (new in ’00)	2005	
*External Evaluations		

Appendix Table 14
Small Grants for Exploratory Research (SGER)
Funding Trends by Directorate, FY 2002 – 2004

		Fiscal Year		
		2002	2003	2004
NSF	Proposals	323	435	640
	Awards	278	344	382
	Total $	$16,694,405	$23,424,191	$29,493,932
	% of Obligations	0.4%	0.4%	0.5%
	Average $	$60,052	$68,094	$77,209
BIO	Proposals	58	52	65
	Awards	40	48	52
	Total $	$2,737,377	$3,417,138	$5,392,558
	% of Obligations	0.5%	0.6%	0.9%
	Average $	$68,434	$71,190	$103,703
CISE	Proposals	26	59	51
	Awards	24	51	48
	Total $	$1,844,149	$3,984,783	$4,215,072
	% of Obligations	0.4%	0.6%	0.7%
	Average $	$76,840	$78,133	$87,814
EHR	Proposals	14	6	17
	Awards	10	5	16
	Total $	$976,897	$418,335	$2,092,916
	% of Obligations	0.1%	0.1%	0.2%
	Average $	$97,690	$83,667	$130,807
ENG	Proposals	88	128	127
	Awards	83	110	119
	Total $	$5,671,667	$7,522,161	$8,147,351
	% of Obligations	1.1%	1.3%	1.4%
	Average $	$68,333	$68,383	$68,465
GEO	Proposals	46	62	68
	Awards	43	60	64
	Total $	$1,514,791	$2,915,587	$3,508,457
	% of Obligations	0.2%	0.4%	0.4%
	Average $	$35,228	$48,593	$54,820
MPS	Proposals	32	97	272
	Awards	21	43	45
	Total $	$1,796,448	$3,820,670	$4,423,294
	% of Obligations	0.2%	0.3%	0.4%
	Average $	$85,545	$88,853	$98,295
SBE	Proposals	42	17	22
	Awards	41	14	22
	Total $	$1,402,168	$605,104	$820,999
	% of Obligations	1.0%	0.4%	0.4%
	Average $	$35,057	$47,459	$37,318
OPP	Proposals	17	14	18
	Awards	16	13	16
	Total $	$715,743	$681,087	$695,961
	% of Obligations	0.2%	0.2%	0.2%
	Average $	$44,734	$52,391	$43,498
OISE	Proposals	0	0	0
	Awards	0	0	0
	Total $	$35,165	$59,326	$62,200
	% of Obligations	0.1%	0.1%	0.2%
	Average $	N/A	N/A	N/A

Appendix Table 15
National Science Foundation Organization Chart



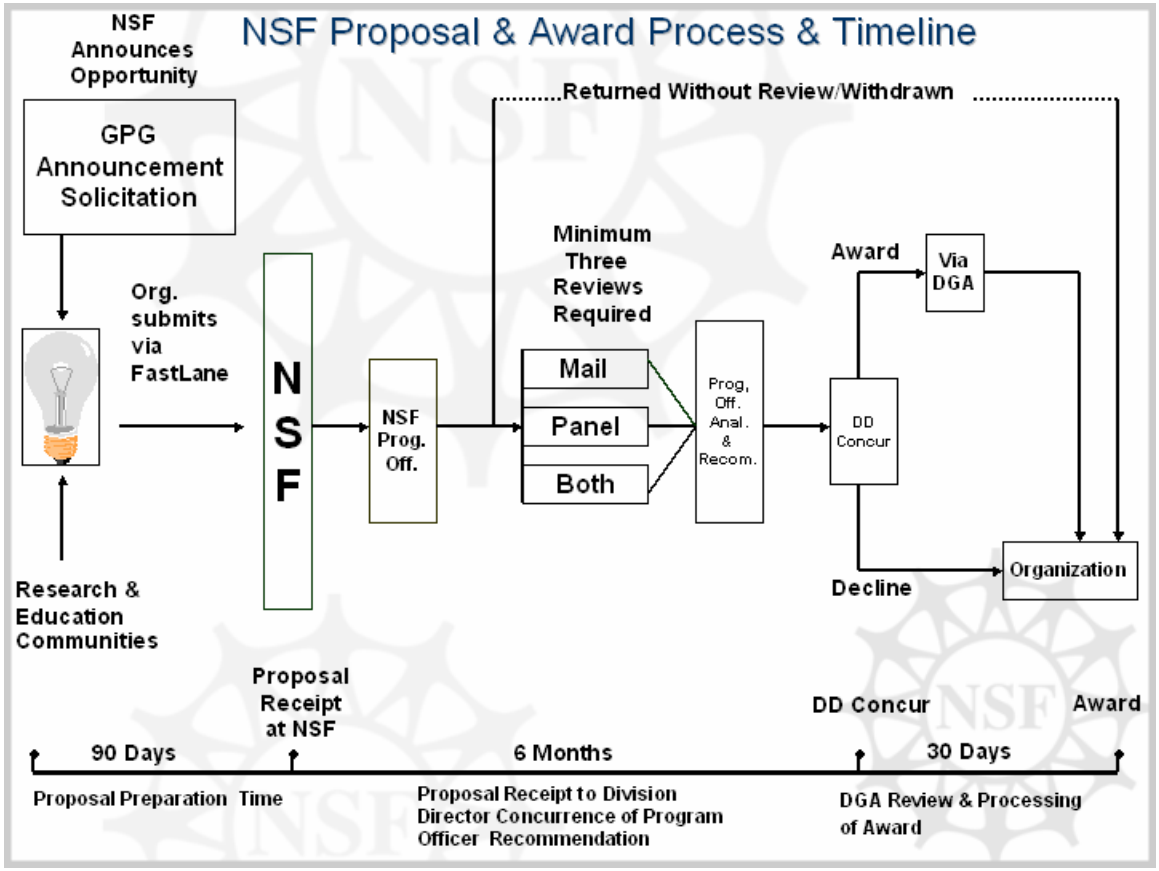
Terms & Acronyms

Acronym	Definition
A&M	Administration and Management
AC	Advisory Committee
AD	Assistant Director
BFA	Office of Budget, Finance and Award Management
BIO	Directorate for Biological Sciences
CAREER	Faculty Early Career Development Program
CGI	Continuing Grant Increments
CISE	Directorate for Computer and Information Science and Engineering
COV	Committee of Visitors
EHR	Directorate for Education and Human Resources
EIS	Enterprise Information System
ENG	Directorate for Engineering
EPSCoR	Experimental Program to Stimulate Competitive Research
FFRDC	Federally Funded Research and Development Center
FTE	Full-Time Equivalent
FY	Fiscal Year
GPRA	Government Performance and Results Act
IA	Integrative Activities
IPA	Intergovernmental Personnel Act (appointee)
IPERS	Integrated Personnel System
MPR	Mathematica Policy Research
MPS	Directorate for Mathematical and Physical Sciences
NSF	National Science Foundation
ODS	Online Document System
OIG	Office of Inspector General
OMB	Office of Management and Budget
OPP	Office of Polar Programs
PARS	Proposal, PI and Reviewer System
PI	Principal Investigator
R&D	Research and Development
R&RA	Research and Related Activities (account)
S&E	Science and Engineering
S&E	Salaries and Expenses (account)
SBE	Directorate for Social, Behavioral and Economic Sciences
SGER	Small Grant for Exploratory Research
VSEE	Visiting Scientists, Engineers and Educators

NSF Merit Review Process

NSF Regional Grants Conferences

2004



NSF Merit Review Criteria

- NSB Approved Criteria include:
  - Intellectual Merit
  - Broader Impacts of the Proposed Effort

What is the intellectual merit of the proposed activity?

- **Potential Considerations:**
  - How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields?
  - How well qualified is the proposer (individual or team) to conduct the project? (If appropriate, the reviewer will comment on the quality of prior work.)
  - To what extent does the proposed activity suggest and explore creative and original concepts?
  - How well conceived and organized is the proposed activity?
  - Is there sufficient access to resources?

What are the broader impacts of the proposed activity?

- **Potential Considerations:**
  - How well does the activity advance discovery and understanding while promoting teaching, training and learning?
  - How well does the activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)?
  - To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks and partnerships?

What are the broader impacts of the proposed activity?

- **Potential Considerations:**
  - Will the results be disseminated broadly to enhance scientific and technological understanding?
  - What may be the benefits of the proposed activity to society?

Return Without Review

- Per Important Notice 127, *"Implementation of new Grant Proposal Guide Requirements related to the Broader Impacts Criterion"* --
  - Proposals that do not separately address both criteria within the one-page Project Summary **will be** returned without review.
- Examples of Broader Impacts
  - http://www.nsf.gov/pubs/2004/nsf042/bicexamples.pdf

Reviewer Selection

- Identifying reviewers
- PI reviewer suggestions

NSF Sources of Reviewers

- Program Officer's knowledge of what is being done and who's doing what in the research area
- References listed in proposal
- Recent technical programs from professional societies
- Recent authors in Scientific and Engineering journals
- S&E Abstracts by computer search
- Reviewer recommendations
- Investigator's suggestions
- (Letter to Program Officer)

Investigator Input

- Proposers are invited to either suggest names of persons they believe are especially well qualified to review the proposal or identify persons they would prefer not to review the proposal.

Managing Conflicts of Interest in the Review Process

Reviewer Conflicts Procedures

- Primary purpose is to remove or limit the influence of ties to an applicant institution or investigator that could affect reviewer advice
- Second purpose is to preserve the trust of the scientific community, Congress, and the general public in the integrity, effectiveness, and evenhandedness of NSF's peer review process

Examples of Affiliations with Applicant Institutions

- Current employment at the institution as a professor or similar position
- Other employment with the institution such as consultant
- Being considered for employment or any formal or informal reemployment arrangement at the institution
- Any office, governing board membership or relevant committee membership at the institution

Examples of Relationships with Investigator or Project Director

- Known family or marriage relationship
- Business partner
- Past or present thesis advisor or thesis student
- Collaboration on a project or book, article, or paper within the last 48 months
- Co-edited a journal, compendium, or conference proceedings within the last 24 months

Role of the Review Panel

- Quality Control
- Budget Constraints
- Balancing Priorities
- Taking Risks

Funding Decisions

- Feedback to PI
- Informal and formal notification
- Scope of work and budget discussions


Reasons For Funding A Competitive Proposal
Likely high impact
PI Career Point (tenured?/"established"/ "young")
Place in Program Portfolio
Other Support for PI
Impact on Institution/State
Special Programmatic Considerations (CAREER/RUI/EPSCoR)
Diversity Issues
Educational Impact
"Launching" versus "Maintaining"