

Report to the National Science Board
on the
National Science Foundation's
Merit Review Process
Fiscal Year 2008



May 2009

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FY 2008 Report on the NSF Merit Review Process

I. Executive Summary

This annual report to the National Science Board (NSB) includes data on proposals and awards and other pertinent information, as well as descriptions of special activities that NSF has undertaken in support of the merit review process. Longitudinal data are given to provide a long-term perspective.

In FY 2008, NSF received a total of 44,428 proposals. This is a slight decrease from the number of proposals received in FY 2007, but remains a nearly 40 percent increase from the 31,942 proposals received in FY 2001.

The Foundation made 11,149 awards in FY 2008 resulting in a 25 percent proposal funding rate. The current funding rate is a decrease from the FY 2001 funding rate of 31 percent, but the current rate has been approximately unchanged over the last five years. However, as indicated by data in Appendix 1, the average funding rate varies by NSF Directorate. Although not included in this report, there is an even greater variation of funding rate by program.

The Foundation continues to exceed its “time to decision” goal of informing at least 70 percent of Principal Investigators (PIs) of funding decisions within six months of receipt of their proposals. In FY 2008, 78 percent of all proposals were processed within six months.

In addition to overall proposal and award data, Section III also includes extensive data on research grants, a category used to represent what may be considered a typical award, particularly with respect to the award size. The funding rate for these proposals was 21 percent in FY 2008. However, the average funding rate for PIs (that is, the number of PIs receiving a grant divided by the number of PIs submitting proposals) was 37 percent for the three-year period 2006-2008. The average annualized research award size was \$143,527 in FY 2008, a slight decrease from the FY 2007 average of \$146,270. The average research award duration remains approximately three years.

Section IV of this Report provides information about the merit review process. Two new items included in this section are: 1) information on an item in the America COMPETES Act that potentially could impact the review of extensions of teacher preparation and broadening participation awards, and 2) the summary of a review of Committee of Visitors reports.

In its September 2005 report to Congress, the National Science Board concluded that the NSF merit review process is fair and effective, and “remains an international ‘gold standard’ for review of science and engineering research proposals.” The Board did provide several recommendations to improve the quality and transparency of the process. Section V provides an update on the activities the Foundation has undertaken in response to the Board recommendations. Also included in Section V is an update on the Foundation’s efforts to promote the support of transformative and interdisciplinary

research. The March 2007 NSB report, *Enhancing Support of Transformative Research at the National Science Foundation* (NSB 07-32), has been instrumental in informing these efforts. In addition, Section V provides information on NSF's implementation of recommendations based on the Impact of Proposal and Award Management Mechanisms (IPAMM) study of the trends, impacts, and causal factors associated with proposal funding rates and proposal submissions.

II. Introduction

The National Science Foundation Act of 1950 directs the Foundation "to initiate and support basic scientific research and programs to strengthen scientific research potential and science education programs at all levels."¹ NSF achieves its unique mission by making merit-based awards to researchers, educators, and students at approximately 1,900 U.S. colleges, universities and other institutions.

All proposals are evaluated using the two NSB-approved criteria: *intellectual merit* and *broader impacts*. As stated in the *NSF Grant Proposal Guide*², consideration is also given to how well the proposed activity 1) fosters the integration of research and education, and 2) broadens opportunities to include a diversity of participants, particularly from underrepresented groups. Additional criteria, as stated in the program announcement or solicitation, may be required to highlight the specific objectives of certain programs or activities. About 97 percent of NSF's proposals are evaluated by external reviewers as well as by NSF staff. The remaining proposals fall under special categories that are, by NSF policy, exempt from external review and are internally reviewed only, such as Small Grants for Exploratory Research (see **Appendix 8**).

This *FY 2008 Report on the NSF Merit Review Process* 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 merit review process. Section III of this report provides summary data about proposals, awards, and funding rates. Longitudinal data are given to provide a long-term perspective; however, in most cases the data provided are for only eight years due to space constraints. Section IV provides information about the process by which proposals are reviewed and awarded. Section V provides information regarding special activities related to the merit review process; in particular, 1) quality and transparency of the review process; 2) impact of proposal and award management mechanisms; and 3) potentially transformative and interdisciplinary research.

¹ 42 CFR 16 §1862, available at http://www4.law.cornell.edu/uscode/html/uscode42/usc_sec_42_00001862----000-.html

² *NSF Grant Proposal Guide* (GPG) available at: http://www.nsf.gov/pubs/policydocs/pappguide/nsf08_1/gpg_index.jsp

III. Proposals and Awards

A. Proposals, Awards and Funding Rates

During FY 2008, NSF received 44,428 proposals, as shown in **Figure 1**. This resulted in 11,149 awards for a funding rate of 25 percent. **Appendix 1** provides proposal, award, and funding rate data by NSF directorate and office.

Figure 1
NSF Proposal, Award, and Funding Rate Trends

	2001	2002	2003	2004	2005	2006	2007	2008
Proposals	31,942	35,165	40,075	43,851	41,722	42,352	44,577	44,428
Awards	9,925	10,406	10,844	10,380	9,757	10,425	11,463	11,149
Funding Rate	31%	30%	27%	24%	23%	25%	26%	25%

Source: NSF Enterprise Information System 10/2/08.

In addition to the full proposals in Figure 1, NSF also received a total of 3,203 preliminary proposals, which are required for some NSF programs. See **Appendix 2** for additional data and information on preliminary proposals.

Figure 2 provides data on proposal, award, and funding rates by PI characteristics (gender, minority status, new and prior PI status).

Figure 2
Competitively Reviewed Proposals, Awards and Funding Rates
By PI Characteristics

		2001	2002	2003	2004	2005	2006	2007	2008
All PIs	Proposals	31,942	35,165	40,075	43,851	41,722	42,352	44,577	44,428
	Awards	9,925	10,406	10,844	10,380	9,757	10,425	11,463	11,149
	Funding Rate	31%	30%	27%	24%	23%	25%	26%	25%
Female PIs	Proposals	5,839	6,704	7,335	8,427	8,266	8,510	9,197	9,431
	Awards	1,894	2,012	2,090	2,118	2,107	2,233	2,493	2,556
	Funding Rate	32%	30%	28%	25%	25%	26%	27%	27%
Male PIs	Proposals	25,510	27,500	31,238	33,300	31,456	31,482	32,650	32,074
	Awards	7,867	8,203	8,495	7,923	7,305	7,765	8,451	7,986
	Funding Rate	31%	30%	27%	24%	23%	25%	26%	25%
Minority PIs	Proposals	1,728	1,906	2,141	2,551	2,468	2,608	2,798	2,762
	Awards	509	548	569	597	569	638	713	670
	Funding Rate	29%	29%	27%	23%	23%	24%	25%	24%
New PIs	Proposals	13,280	15,085	17,584	19,052	17,660	18,061	18,971	18,989
	Awards	3,136	3,329	3,390	3,256	3,001	3,240	3,660	3,622
	Funding Rate	24%	22%	19%	17%	17%	18%	19%	19%
Prior PIs	Proposals	18,662	20,080	22,511	24,799	24,062	24,294	25,606	25,439
	Awards	6,789	7,077	7,478	7,124	6,756	7,185	7,803	7,527
	Funding Rate	36%	35%	33%	29%	28%	30%	30%	30%
PIs with Disabilities	Proposals	409	466	494	525	454	434	448	448
	Awards	115	128	124	121	95	107	104	109
	Funding Rate	28%	27%	25%	23%	21%	25%	23%	24%

Source: NSF Enterprise Information System 10/2/08

Gender and minority status is based on self-reported information in proposals, with about 91 percent of PIs providing this information. Minority status includes American Indian, Alaska Native, Black, Hispanic, and Pacific Islander and excludes Asian and White-Not of Hispanic Origin. New principal investigators are PIs who have not previously been awarded an NSF grant. **Appendix 3** provides proposal, award, and funding rate information by minority PI status.

B. Types of Awards

In general, NSF uses three kinds of funding mechanisms: grants, cooperative agreements, and contracts. Most of NSF's projects support or stimulate scientific and engineering research and education, and are funded using grants or cooperative agreements. A grant is the primary funding mechanism used by NSF. A grant can be funded as either a standard award (in which funding for the full duration of the project, generally 1-5 years, is awarded in a single fiscal year) or a continuing award (in which funding of a multi-year project is usually provided in annual increments). For continuing grants, the initial funding increment is accompanied by a statement of intent to continue funding the project in yearly increments (called "continuing grant increments" or CGIs)³ until the project is completed. The continued funding is subject to NSF's judgment of satisfactory progress, availability of funds, and receipt and approval of required annual reports. Cooperative agreements are used when the project requires substantial agency involvement during the project performance period (e.g., research centers, multi-user facilities). Contracts are used to acquire products, services and studies (e.g., program evaluations) required primarily for NSF or other government use.

As shown below in **Figure 3**, in FY 2008, NSF devoted 28 percent of its total budget to new standard grants and 13 percent to new continuing grants. The use of standard and continuing grants allows NSF flexibility in balancing current and future obligations, and managing funding rates.

Figure 3
Percentage of NSF Awards by Funding Mechanism

CATEGORY	2002	2003	2004	2005	2006	2007	2008
Standard Grants	27%	25%	25%	23%	25%	26%	28%
New Continuing	16%	16%	14%	14%	13%	14%	13%
CGIs and Supplements	26%	26%	28%	29%	28%	26%	26%
Cooperative Agreements	22%	25%	24%	24%	23%	22%	23%
Other*	9%	9%	9%	10%	11%	11%	11%

Source: NSF Enterprise Information System 12/11/08.
Percentages may not sum to 100 due to rounding.

*Includes contracts, fellowships, interagency agreements, and IPA agreements.

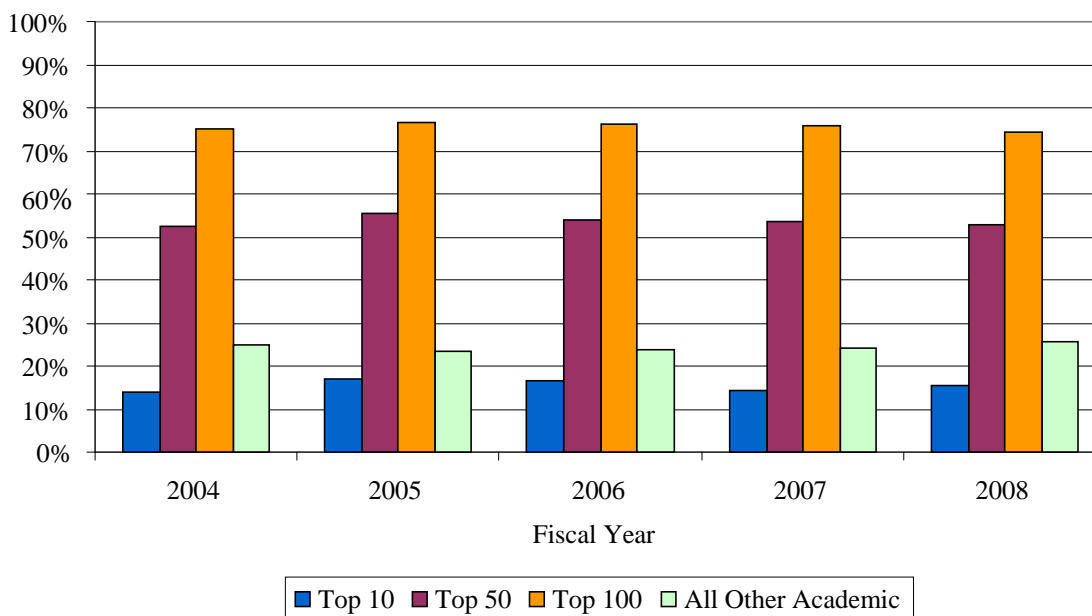
³ While the original award is a competitive action, the Continuing Grant Increment (CGI) is a non-competitive renewal grant. Continued incremental funding is based on NSF review of annual project reports and additional oversight mechanisms established by specific programs.

C. Awards by Sector/Institution

In FY 2008, NSF awarded 76 percent of its budget to academic institutions, 13 percent to non-profit and other organizations, 8 percent to for-profit businesses, and 3 percent to Federal agencies and laboratories. This overall distribution of funds by type of organization has remained fairly constant over the past five years.

For **Figure 4**, academic institutions are categorized according to the proportion of NSF funding received (i.e., those receiving the largest proportion of NSF funding – the top 10, 50, and 100 academic institutions).

Figure 4
Percentage of Awards to Academic Institutions
(By Proportion of Funds Received)



Source: NSF Enterprise Information System 10/2/08.

The Foundation also tracks funding rates for different types of academic institutions. For FY 2008, the funding rate was 27 percent for the top 100 Ph.D.-granting institutions according to the amount of FY 2008 funding received. In comparison, the rate was 18 percent for the Ph.D.-granting institutions that are not in the top 100 NSF-funded category. The funding rates for two- and four-year institutions were 33 percent and 24 percent, respectively for FY 2008. For minority-serving institutions, the FY 2008 funding rate was 21 percent.

NSF had three performance goals related to increasing participation of institutions not in the list of top 100 receiving NSF support: 1) increase percentage of research proposals from outside the top 100 institutions; 2) increase the percentage of education proposals

from outside the top 100 institutions, and 3) increase the percentage of Major Research Instrumentation Program proposals from outside the top 100 institutions. The first and third of these goals were achieved.

The Foundation also promotes geographic diversity of the participants in its programs. For example, the mission of the Experimental Program to Stimulate Competitive Research (EPSCoR) is to assist the National Science Foundation in its statutory function “to strengthen research and education in science and engineering throughout the United States and to avoid undue concentration of such research and education.” The EPSCoR program was designed for those jurisdictions that have historically received lesser amounts of NSF Research and Development (R&D) funding. Twenty-five states, the Commonwealth of Puerto Rico and the U.S. Virgin Islands currently participate. **Appendix 7** has data on proposals, awards, and funding rates for the EPSCoR jurisdictions.

In the past year, NSF made a number of outreach presentations to diverse institutions across the country in an effort to increase awareness and improve the transparency of the NSF merit review process:

- Two Regional Grants Conferences were held in FY 2008. These conferences were organized by the NSF Policy Office, and hosted by Portland State University and the University of Rhode Island.
- Nine ‘NSF Days,’ organized by the Office of Legislative and Public Affairs, were held throughout the year in California, Indiana, Massachusetts, Michigan, Nevada, New Hampshire, North Carolina, Texas, and West Virginia.

Representatives from most of NSF’s directorates and offices attended each of these conferences. They held separate focus sessions for faculty on programs opportunities in specific disciplines in addition to providing general information about proposal preparation and the merit review process.

NSF also hosted several informational booths at scientific meetings such as the annual meeting of the American Association for the Advancement of Science (AAAS). In addition to these larger NSF-wide organized efforts, outreach workshops were sponsored by several of the individual directorates, as well as EPSCoR, the Small Business Innovation Research (SBIR) program, and other NSF-wide programs. Finally, Program Officers frequently conduct outreach on an individual basis, when visiting institutions or participating in scientific meetings. NSF outreach to scientists and engineers from underrepresented groups includes efforts such as workshops for tribal colleges and minority-serving institutions, including historically black colleges and universities.

D. Time to Decision (Proposal Dwell Time)

It is important for applicants to receive a timely funding decision. The Foundation’s FY 2008 GPRA performance goal calls for informing at least 70 percent of PIs of funding decisions (i.e., award or decline) within six months of receipt. As indicated in **Figure 5**, NSF is surpassing this goal.

Figure 5
Proposal Dwell Time
Percentage of Proposals Processed Within 6 Months

2001	2002	2003	2004	2005	2006	2007	2008
63%	74%	77%	77%	76%	78%	77%	78%

Source: NSF Enterprise Information System 10/2/08

D. Data on Research Grants

Research grant is a term used by NSF to represent what may be considered a typical research award, particularly with respect to the award size. Education research grants are included in this category. Excluded are large awards such as centers and facilities, as are equipment and instrumentation grants. Also excluded are grants for conferences and symposia, grants in the Small Business Innovation Research program, Small Grants for Exploratory Research, and education and training grants.

E1. Research Proposal, Grant, & Funding Rate Trends

Figure 6 provides the proposal, grant, and funding rate trends for NSF research grants. Since FY 2001, there has been a large increase in the number of research proposals received by NSF. The number of research grants, however, was relatively constant from FY 2001 through FY 2008 with a slight decrease in FY 2008. The funding rate decreased through FY 2005, rose for fiscal years FY 2006, FY 2007, and then decreased slightly in FY 2008 to 21%. **Figure 1** (page 7) provides data on all NSF proposals and awards.

Figure 6
Research Grant Proposal, Grant & Funding Rate Trends

	2001	2002	2003	2004	2005	2006	2007	2008
Proposals	23,096	25,241	28,676	31,553	31,574	31,514	33,705	33,643
Awards	6,218	6,722	6,846	6,509	6,258	6,708	7,415	6,999
Funding Rate	27%	27%	24%	21%	20%	21%	22%	21%

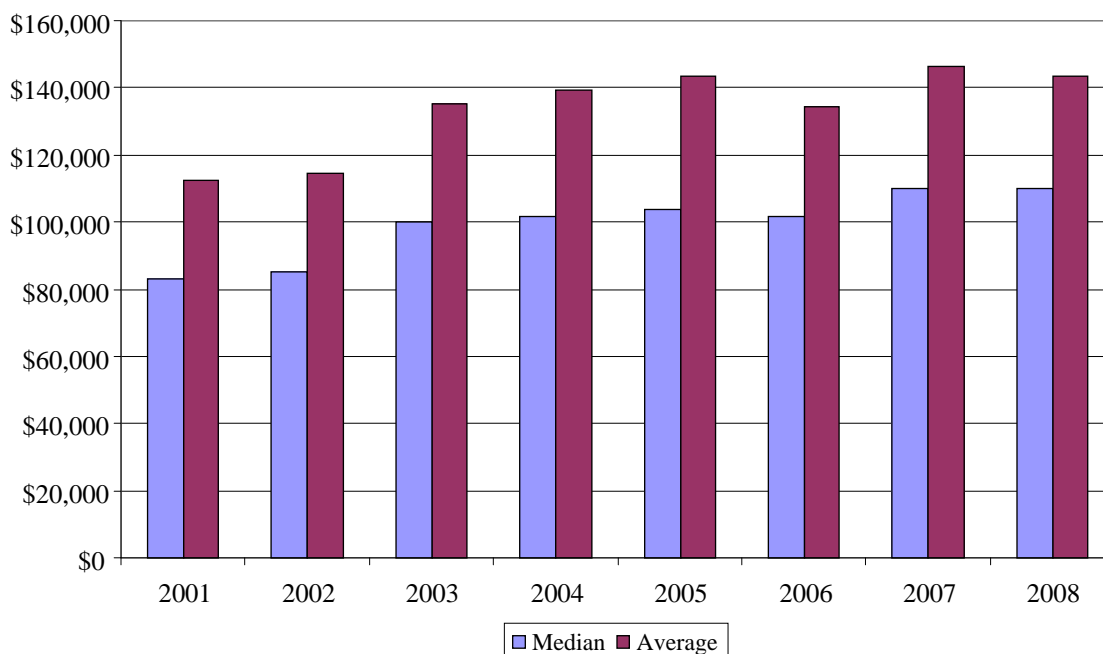
Source: NSF Enterprise Information System 10/2/08

E2. Research Grant Size and Duration

Adequate award size and duration are important for attracting high-quality proposals and ensuring that proposed work can be accomplished as planned. Larger award size and longer award duration may also permit the participation of more students and allow investigators to devote a greater portion of their time to conducting research.

Both the average annualized and median award amount for research grants had been increasing until FY 2006, during which time there was a decrease in both average and median award amounts, as displayed in **Figure 7**. In FY 2007, there was an increase continued for both indicators, followed by a small decrease in both average and median award amounts for FY 2008. Data by NSF directorate for the last five years are presented in **Appendix 4**.

Figure 7
Annualized Award Amounts for Research Grants



Source: NSF Enterprise Information System 10/2/08

As indicated in **Figure 8**, the average award duration has remained relatively constant.⁴ Program officers must balance competing requirements, such as increasing award size, increasing duration of awards, and/or making more awards.

Figure 8
Average Award Duration for Research Grants

	2001	2002	2003	2004	2005	2006	2007	2008
Duration (Years)	2.9	2.9	2.9	3.0	3.0	2.9	2.9	3.0

Source: NSF Enterprise Information System 10/2/08

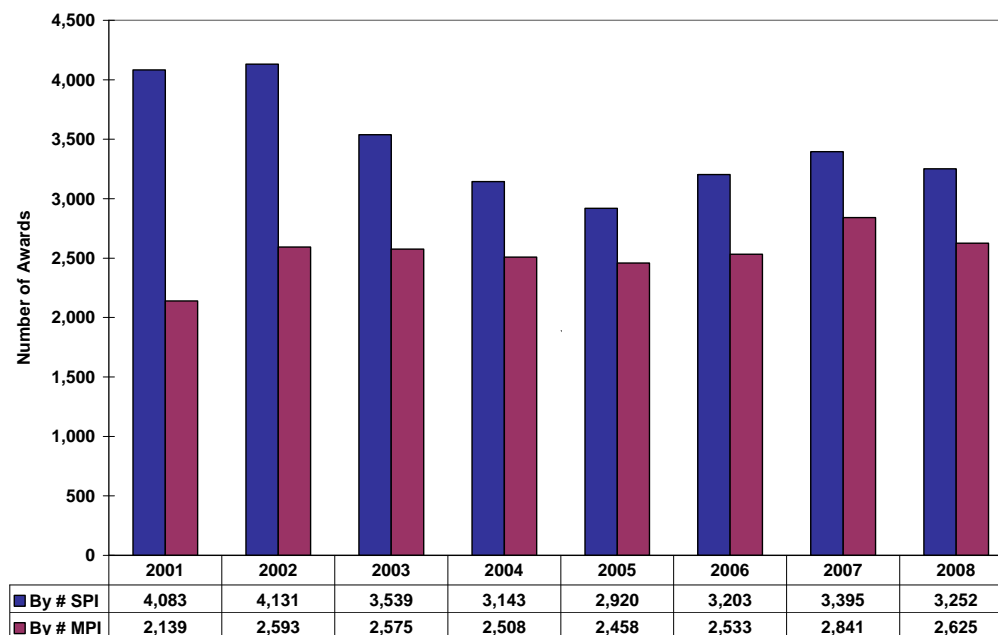
⁴ Although the number of years is rounded to one decimal place, the variations do not indicate significant changes since 0.1 years represents only about five weeks. In addition, this duration rate is the initial duration for new awards made in FY 2008. The rate does not take into account no-cost extensions.

E3. Number of Investigators per Research Grant

Figure 9 indicates the number of grants made to research proposals with a single PI in comparison to the number of grants to proposals with multiple PIs. The number of Single-PI grants remains greater than the number of multiple-PI grants, although the gap between these two categories of grants has generally been narrowing over time.

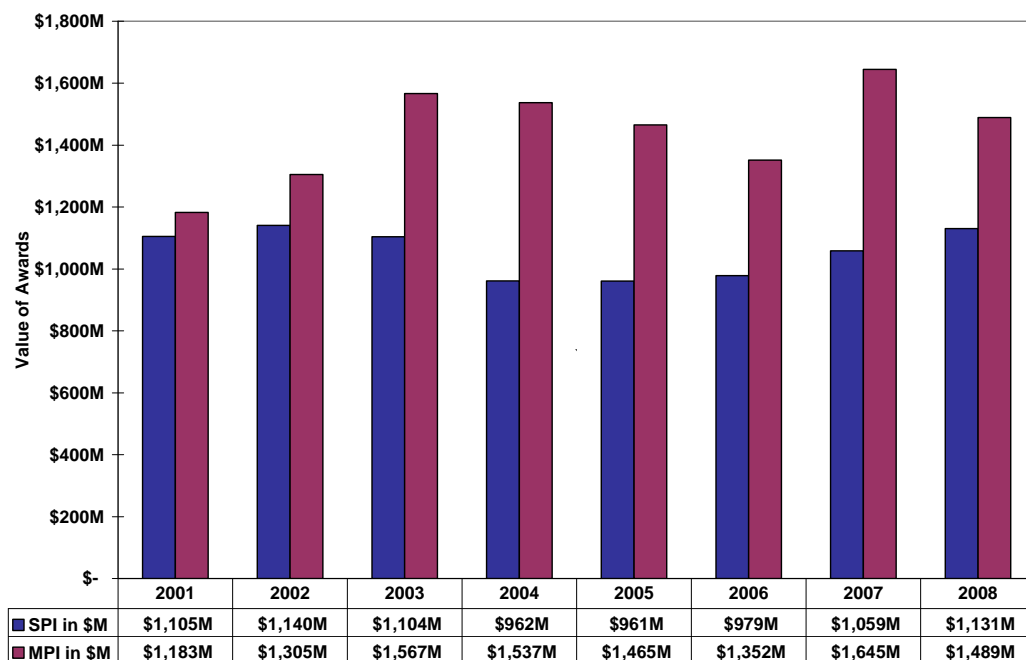
In addition, **Figure 9** indicates the total amount of funds awarded to single PI research grants in comparison to the amount of funds awarded to multiple PI research grants.

Figure 9
Research Grants for Single PIs (SPI) & Multiple PIs (MPI), by Number of Grants



Source: NSF Enterprise Information System 10/2/08.

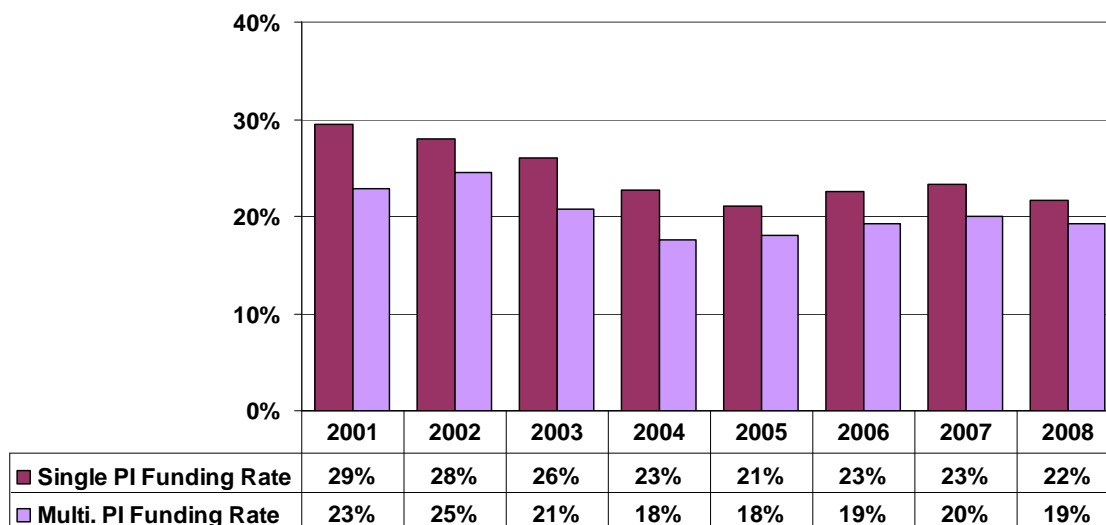
Figure 9.1
Research Grants for Single PIs (SPI) & Multiple PIs (MPI), by Dollar Amount



Source: NSF Enterprise Information System 10/2/08.

Figure 10 indicates the funding rates for single-PI (SPI) and multiple-PI (MPI) research proposals. The difference between the SPI and MPI funding rate has varied over the last ten years, but the SPI funding rate has been consistently higher.

Figure 10
Funding Rates for Single-PI & Multiple-PI Research Proposals



Source: NSF Enterprise Information System 10/2/08.

E4. Number of Research Grants per PI

Figure 11 indicates the average number of active research grants per PI during the indicated time period. These percentages have remained relatively unchanged from previous years.

Figure 11
Number of Grants per PI

Fiscal Years	One	Two	Three	Four or More
2006-2008	83%	13%	3%	1%

Source: NSF Enterprise Information System 10/2/08
Percentages may not sum to 100 due to rounding.

E5. Number of People Supported on Research Grants

Figure 12 provides the number of graduate students, postdoctoral associates, and senior personnel supported on NSF research grants awarded in FY 2008. These data are extracted from the budget details of research grants that are active in the indicated year.

Figure 12
Number of People Supported on NSF Research Grants, by Recipient Type

	2001	2002	2003	2004	2005	2006	2007	2008	% Change, 2001 - 2008
Senior Personnel	17,443	18,643	19,864	21,711	22,255	23,186	26,176	26,494	52%
Postdoctoral Associates	4,367	4,320	4,629	4,399	4,068	4,023	4,034	3,909	-10%
Graduate Students	18,717	19,303	20,384	21,105	20,442	20,949	22,777	22,936	23%

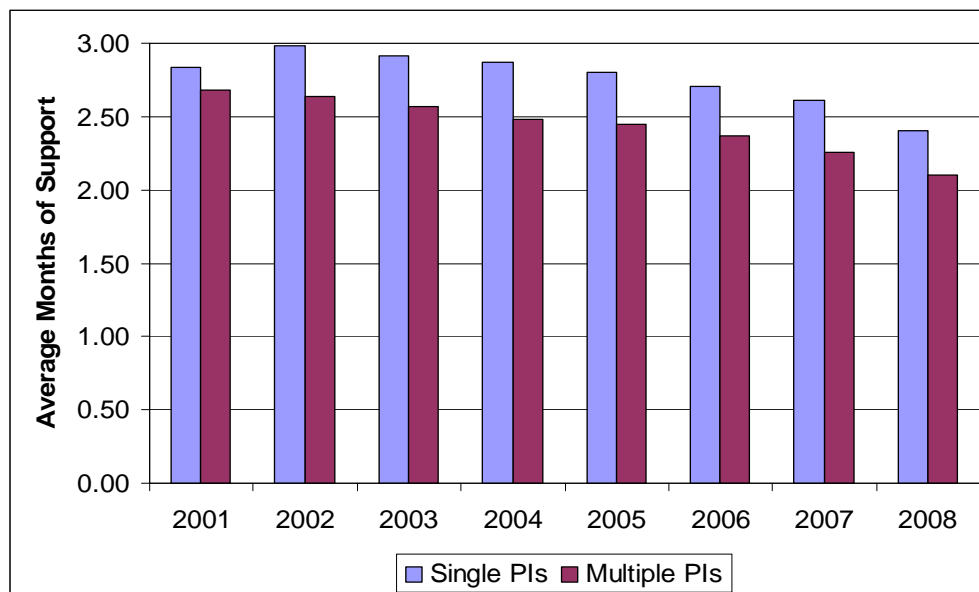
Source: NSF Enterprise Information System 10/2/08

Appendix 6 provides data on the estimated number of individuals involved in NSF activities supported by all NSF active awards, including senior researchers, postdoctoral associates, teachers, and students across all educational levels.

E6. Average Number of Months of Salary Support for Single- & Multiple-PI Research Grants

Figure 13 indicates the average number of months of salary support per individual on single and multiple PI research grants. Months of salary support are for PIs and Co-PIs only. Since FY 2001, the average number of months of support has generally decreased for both single and multiple PIs. Also, multiple PIs consistently averaged fewer months of support than single PIs (see **Appendix 5** for Directorate or Office level data on months of support).

Figure 13
Average Number of Months of Salary Support for Single- & Multiple-PI Research Grants

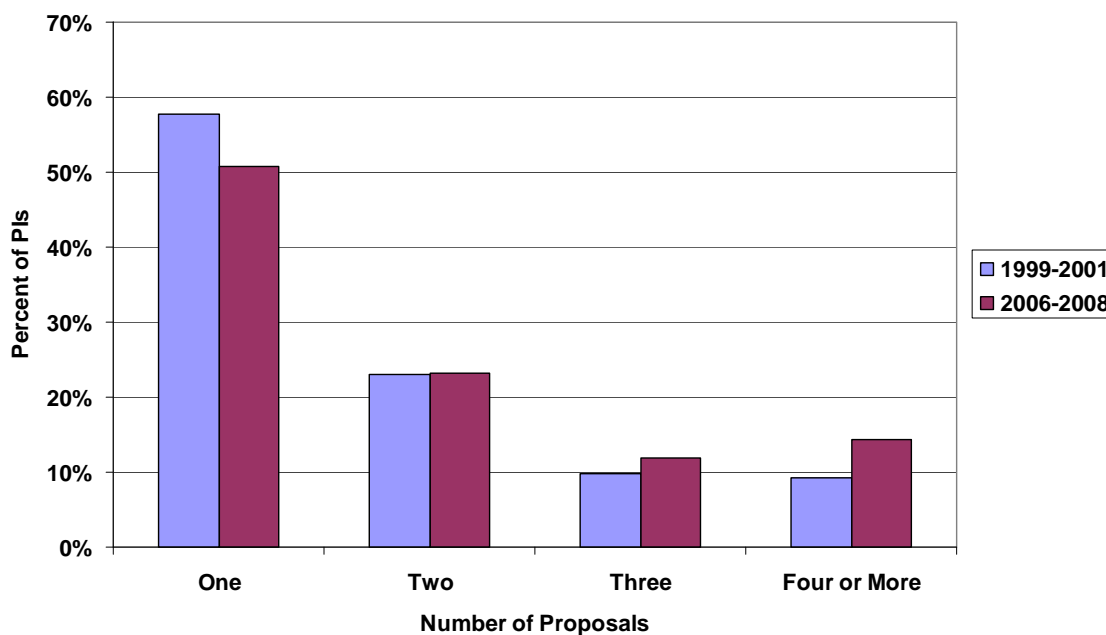


Source: NSF Enterprise Information System 10/2/08

E7. Investigator Submission and Funding Rates

The purpose of this section is to indicate trends in the average number of proposals investigators submit over a three-year period and their subsequent success in obtaining funding. **Figure 14** indicates that there is an increase in the percentage of investigators submitting multiple proposals during the interval FY 2006-2008 over FY 1999-2001.

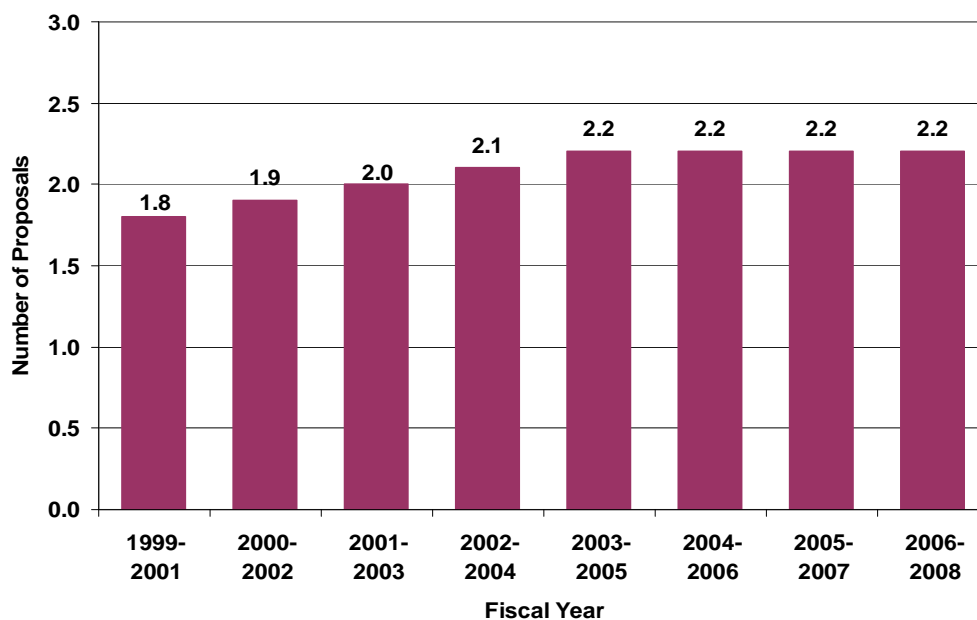
Figure 14
Distribution of Number of Research Proposal Submissions per Grant



Source: NSF Enterprise Information System 10/2/08

Figure 15 shows that on average the number of proposals an investigator submits before receiving a grant has stayed constant at 2.2 proposals for the past five years. This average is calculated across all PIs, including both new and previous PIs.

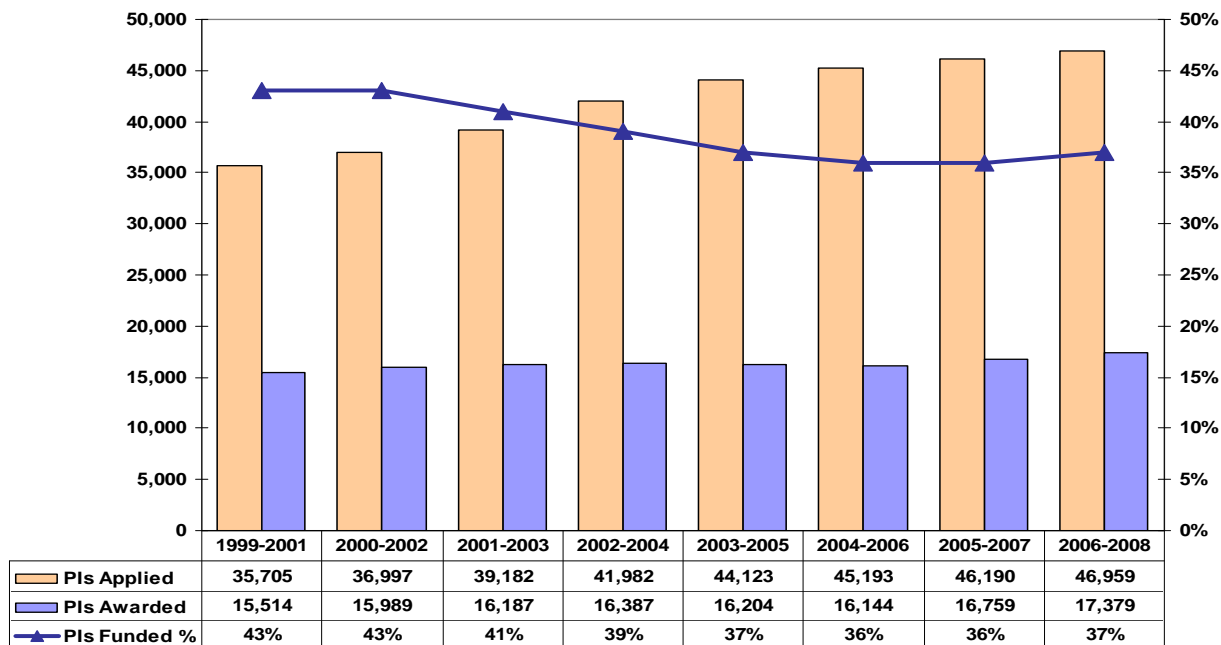
Figure 15
Average Number of Research Proposals per PI before Receiving One Grant



Source: NSF Enterprise Information System 10/2/08

However, as shown in **Figure 16**, the funding rate for investigators (the number of investigators receiving a grant divided by the number of investigators submitting proposals) has been decreasing between the periods of FY 2000 to FY 2007. There was a slight increase in FY 2006-2008.

Figure 16
NSF PI Funding Rates for Research Grants

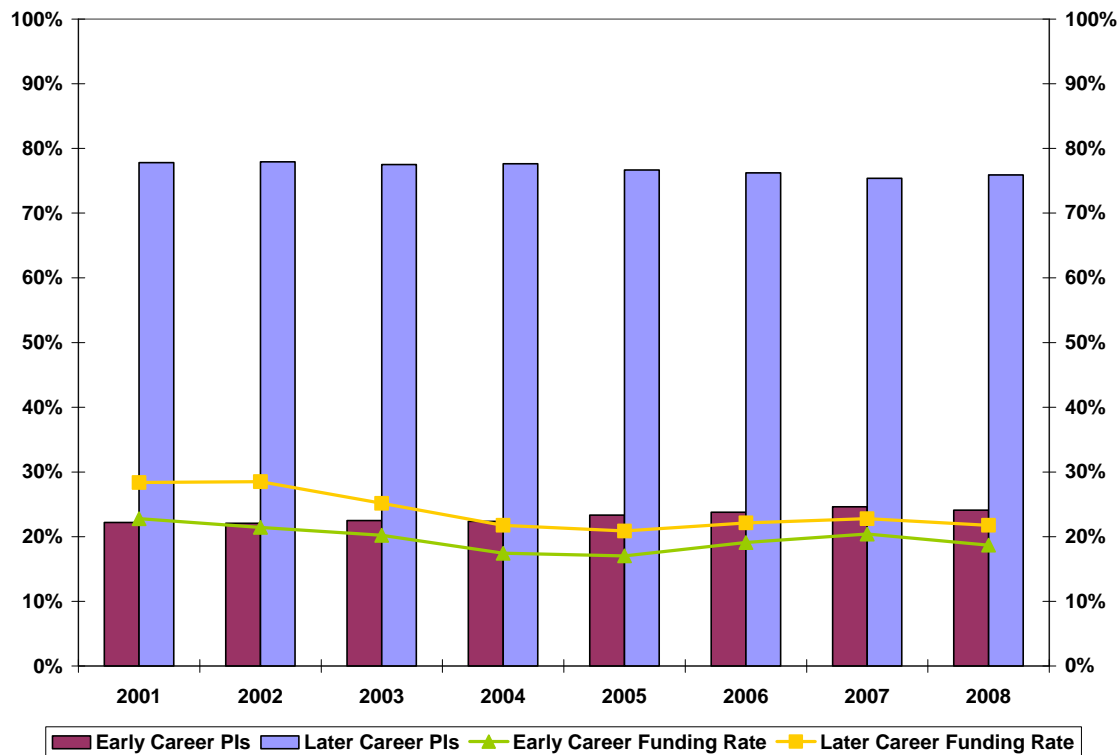


Source: NSF Enterprise Information System 10/2/08

E8. Early and Later Career PIs

Figure 17 indicates the percentage of NSF PIs that are in the early or later stage of their career. An early career PI is defined as someone within seven years of receiving their last degree at the time of the award. Since FY 2001, the percentage of early career PIs has remained relatively constant at about 22% and the percentage of later career PIs has also remained constant at about 78%. This figure indicates the funding rates for early and later career PIs, which tend to shift in tandem.

Figure 17
Percentage of Early & Later Career PIs & Research Grant Funding Rates



Source: NSF Enterprise Information System 10/2/08

IV. The NSF Merit Review Process

A. Merit Review Criteria

In FY 1998, the National Science Board approved the use of the two current NSF merit review criteria, and, in FY 2007, modified the criteria to promote potentially transformative research. The two criteria now in effect are:

Intellectual Merit. 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, original, or potentially transformative concepts? How well conceived and organized is the proposed activity? Is there sufficient access to resources?

Broader Impacts. 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?

Careful consideration is also given to the following in making funding decisions: 1) *Integration of Research and Education* and 2) *Integrating Diversity into NSF Programs, Projects, and Activities*, as is indicated in the *Grant Proposal Guide*⁵. Programs may have additional review criteria specific to the goals and objectives of the program. All relevant review criteria are described in the program announcement or solicitation.

Effective October 1, 2002, NSF returned without review proposals that failed to address separately both merit review criteria within the Project Summary. The number of proposals returned without review for failing to address both NSB merit review criteria has been steadily decreasing since 2003; FY 2008 marks a departure from that trend, with a slight increase in the number of proposals returned without review for failing to address both merit review criteria.

Figure 18
Proposals Returned Without Review for Failing to Address both Merit Review Criteria

Fiscal Year	2003	2004	2005	2006	2007	2008
Number of Proposals	276	236	176	134	117	124

Source: NSF Enterprise Information System 10/2/08

⁵The National Science Foundation *Grant Proposal Guide* can be accessed online at: http://www.nsf.gov/pubs/policydocs/pappguide/nsf08_1/gpg_index.jsp.

B. Description of NSF Merit Review Process

The NSF merit review process includes the steps listed below and is depicted in **Figure 19**:

- The proposal arrives electronically and is assigned to the appropriate program(s) for review. Some programs also include preliminary proposals as part of the application process. See **Appendix 2** for more information about preliminary proposals. Proposals that do not comply to NSF regulations, as stated in the *Grant Proposal Guide*, may be returned without review.
- The program officer (or team of program officers) reviews the proposal and assigns it to at least three experts from outside the Foundation. NOTE: Some proposals do not require external review. These include, for example, Small Grants for Exploratory Research (SGER) and proposals for small conferences, workshops, or symposia. See **Appendix 8** for more information about SGER proposals.

The review process is overseen by a Division Director, or other appropriate NSF official. The program officer or team:

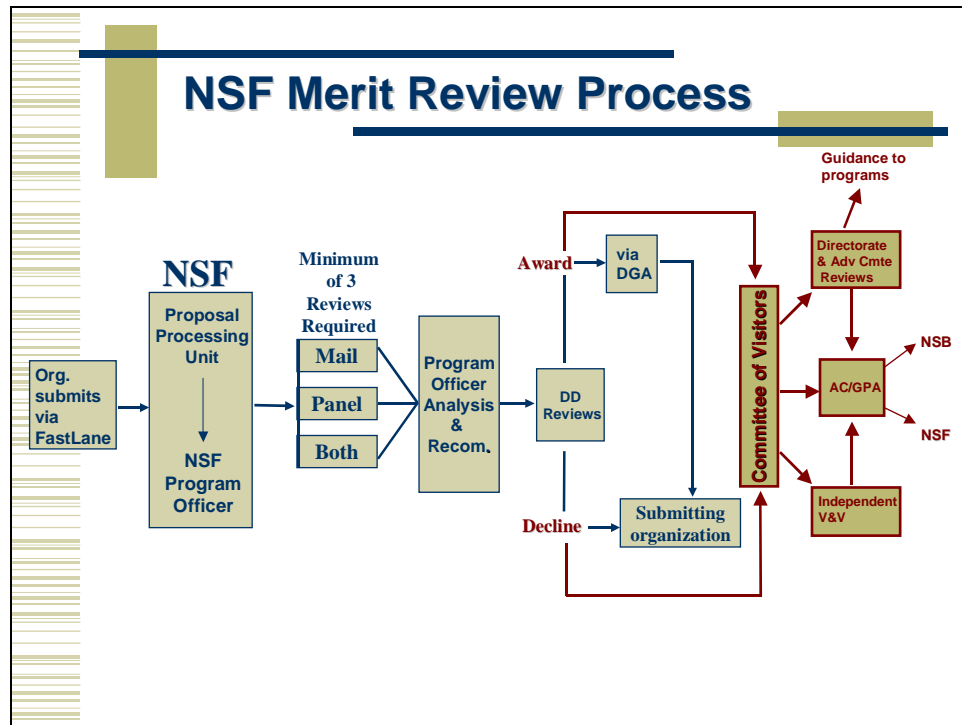
- selects reviewers and panel members, based on program officer's knowledge, references listed in the proposal, individuals cited in recent publications or relevant journals, presentations at professional meetings, reviewer recommendations, bibliographic and citation databases, and proposal author's suggestions.
- checks for conflicts of interest. In addition to checking proposals and selecting reviewers with no apparent potential conflicts, NSF staff provide reviewers guidance and instruct them how to identify and declare potential conflicts-of-interest. All NSF program officers receive annual conflict of interest training.
- synthesizes the comments of the reviewers and panel (if reviewed by a panel), as provided in the individual reviewer analyses and panel summaries.
- 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.

The Division Director, or other appropriate NSF official, reviews all program officer recommendations. Large awards may receive additional review. The Director's Review Board examines award recommendations with an average annual award amount of 2.5 percent or more of the awarding Division's annual budget. The National Science Board reviews recommended awards with an annual award amount of one percent or more of the awarding Directorate's annual budget.⁶ In FY 2008, NSB approved 16 funding items

⁶ Other items requiring NSB prior approval include new programs, major construction projects that meet certain specifications, as well as programs and awards involving policy issues.

including 15 awards, and extending one co-operative agreement. Once approved, a grants officer in the Office of Budget, Finance, and Award Management performs an administrative review of award recommendations.

Figure 19
Diagram of the NSF Merit Review Process



The Foundation has a variety of mechanisms in place to ensure the integrity of the merit review process:

- An external Committee of Visitors (COVs), whose membership is comprised of scientists, engineers, and educators, assesses each major NSF program every 3-5 years. COVs examine the integrity and efficiency of merit review processes and the results from the programmatic investments.
- NSF directorates and offices have Advisory Committees (comprised of scientists, engineers, and educators). One of the tasks of these Advisory Committees is to review COV reports and staff responses in order to provide guidance to the Foundation. The COV reports and NSF responses are publically available on the NSF website.
- The Government Performance and Results Act of 1993 (GPRA) was established to provide strategic planning and performance measurement in the Federal Government. The NSF-wide Advisory Committee for GPRA Performance Assessment (AC/GPA), a committee of external experts convened yearly to assess programmatic results, evaluates the Foundation's portfolios and their linkages to strategic outcome goals. The AC/GPA uses Committee of Visitors 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 the Foundation's performance measurements, which include aspects of the merit review process.
- One role of the National Science Board's Audit and Oversight Committee is to review the findings presented by the AC/GPA.
- The Program Assessment Rating Tool (PART), developed by the Office of Management and Budget, is used to assess program performance of federal agencies in four areas: Program Purpose and Design, Strategic Planning, Program Management, and Program Results/Accountability.

Additional information about COVs, NSF Advisory Committees, and AC/GPA is provided in **Appendix 9**.

Section V describes special activities NSF has been conducting regarding the implementation of several aspects of the merit review process.

C. Program Officer Award/Decline Recommendations

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

NSF program officers are experts themselves in the scientific areas that they manage. They have advanced educational training (e.g., a Ph.D. or equivalent credentials) in science or engineering and relevant experience in research, education, and/or administration. They are expected to produce and manage a balanced portfolio of awards that addresses a variety of considerations and objectives. When making funding recommendations, in addition to information contained in the external proposal reviews, NSF program officers evaluate proposals in the larger context of their overall portfolio and consider issues such as:

- Support for potentially transformative advances in a field;
- Novel approaches to significant research questions;
- Capacity building in a new and promising research area;
- Potential impact on the development of human resources and infrastructure;
- NSF core strategies, such as 1) the integration of research and education and 2) broadening participation;
- Achievement of special program objectives and initiatives;
- Other available funding sources; and
- Geographic distribution.

D. Review Information to Proposer and Appeal Process

Proposers receive notification of the award/decline decision, copies of all reviews used in the decision with reviewer-identifying information redacted, and a copy of the panel summary (if panel review was conducted). A "context statement" is also sent that explains the broader context under which any given proposal was reviewed. Program Officers are also expected to provide additional communication (either in writing or by phone) to proposers in the case of a decline recommendation if the basis for the decision is not provided in the panel summary.

If, after receiving the reviews and other documentation of the decision, an unsuccessful proposer would like additional information, he or she may ask the program officer for further clarification. If, after considering the additional information, the applicant is not satisfied that the proposal was fairly handled and reasonably reviewed, he or she may request formal reconsideration. Information about the reconsideration process is included in all decline notifications.⁷ A reconsideration 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 relevant NSF Assistant Director or Office Director 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 annual requests for formal reconsideration. The number of requests for formal reconsideration and resulting decisions at both the Assistant Director and Director levels from FY 2002 through FY 2008 are displayed in **Appendix 10**. NSF received 34 formal reconsideration requests in FY 2008; 34 decline decisions were upheld.

E. Methods of External Review

The Foundation's merit review process relies on extensive use of knowledgeable experts from outside NSF. As stated in the *Grant Proposal Guide* (GPG), proposals usually receive at least three external reviews. Under certain circumstances the requirement for external review can be waived.⁸

NSF programs obtain external peer review by three principal methods: (1) "mail-only," (2) "panel-only," and (3) "mail-plus-panel" review. The total numbers of reviews and the average numbers of reviews per proposal obtained by the three different review methods are presented in **Figure 20**. The mail-plus-panel method had the highest number of reviews per proposal, averaging nearly seven, while the mail-only method averaged around four. Directorate-level data for FY 2008 are presented in **Appendix 11**.

⁷ Please note that certain types of proposals are not eligible for reconsideration. See NSF *Grant Proposal Guide* (GPG) at http://www.nsf.gov/pubs/policydocs/pappguide/nsf08_1/gpg_4.jsp#IVD

⁸ Exemptions that program officers may choose to exercise, for example, include proposals for Small Grants for Exploratory Research (SGER) and certain categories of workshop and symposia proposals. See Appendix 7 for more information about SGER proposals.

Figure 20
Reviews per Proposal, FY 2008

	All Methods	Mail + Panel	Mail-Only	Panel-Only
Reviews	248,772	100,144	15,665	132,963
Proposals	42,983	14,355	3,662	24,966
Rev/Prop	5.8	7.0	4.3	5.3

Source: NSF Enterprise Information System 10/2/08

In addition, site visits (on-site and reverse-site) 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 approval by the Division Director or other NSF official.

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.

‘Panel-only’ refers to the process of soliciting reviews from panelists who convene to discuss their reviews and provide advice to the program officer.

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

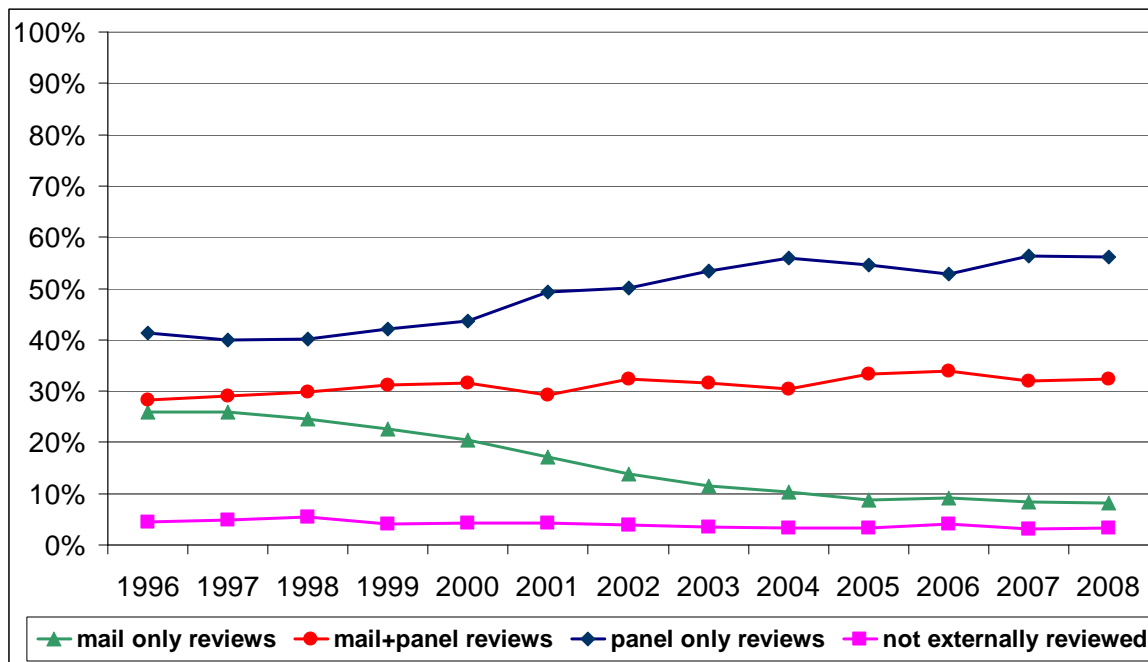
- A reviewer submits a mail review and also serves as a panelist.
- A reviewer submits a mail review, but does not serve on the panel.
- A reviewer does not submit a mail review, but participates as a panelist. Panelists discuss the proposal and mail reviews to formulate advice for the program officer.

The use of various review methods has changed markedly over time, as shown in **Figure 21**. The data for **Figure 21** are provided in **Appendix 12** and **Appendix 12.1** provides data on review methods by directorate and office.

There are a number of reasons for the trend away from mail-review only. Panels allow reviewers to discuss and compare proposals. Panels tend to be used for programs that have deadlines and target dates, as opposed to unrestricted submission windows. The panel review process has the advantage that different perspectives can be discussed and integrated if appropriate. 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 2008, 80 percent of all proposals reviewed by panel-only were processed within six months, compared to 75 percent for mail + panel and 66 percent for mail-only. A chief advantage of mail review is that the expertise of the reviewers can be more

precisely matched to the proposal. The mail + panel review process is used frequently because it combines the in-depth expertise of mail review with the comparative analysis of panel review.

Figure 21
FY 1996-2008 Trend, NSF Review Method



Source: NSF Enterprise Information System 10/2/08

Some programs use “virtual panels.” In virtual panels, panelists participate from their offices or homes and interact using NSF’s Interactive Panel System (IPS), accompanied by a teleconference. Around 97 percent of panels, whether they assemble at NSF, offsite at a common location, 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. The Foundation 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.

F. Data on Reviewers

The Foundation maintains a central electronic database of more than 300,000 reviewers who can potentially be drawn on to participate in mail or panel reviews. 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 other reviewers. During FY 2008, approximately 45,000 individuals served on panels,

conducted a mail review for one or more proposals, or served in both functions. About 15,000 of these reviewers had never reviewed an NSF proposal before. The reviewers were from all 50 states in addition to the District of Columbia, Puerto Rico, Virgin Islands, and other U.S. jurisdictions. More than 6,000 reviewers were from outside of the United States. Moreover, reviewers were from a range of institutions, including two-year and four-year colleges and universities, Master's level and Ph.D.-granting universities, industry, profit and non-profit institutions, K-12 systems, informal science institutions, and government. NSF also maintains data 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 2008, out of a total of 42,035 distinct reviewers who returned reviews, 12,442 – about 30 percent -- provided demographic information. Out of the 12,442 who provided information, 4,586 (37%) indicated they were members of an underrepresented group.

During FY 2004, NSF altered the FastLane reviewer module to make it more convenient for reviewers to provide demographic information and, as a result, NSF has seen a slight increase in the proportion of reviewers providing demographic information. In FY 2008, 30 percent provided information in comparison to 28 percent in FY 2007, and 25 percent in FY 2006. However, provision of demographic data is voluntary and given the low response rate, there is not enough information to establish a baseline. This remains a challenge that the Foundation continues to address.

The NSF library continually updates its resources to help NSF staff identify reviewers. This includes the collection and sharing of potential reviewer data from associations that work with underrepresented groups in science and engineering. Frequent tutorials on finding reviewers are also available for program officers.

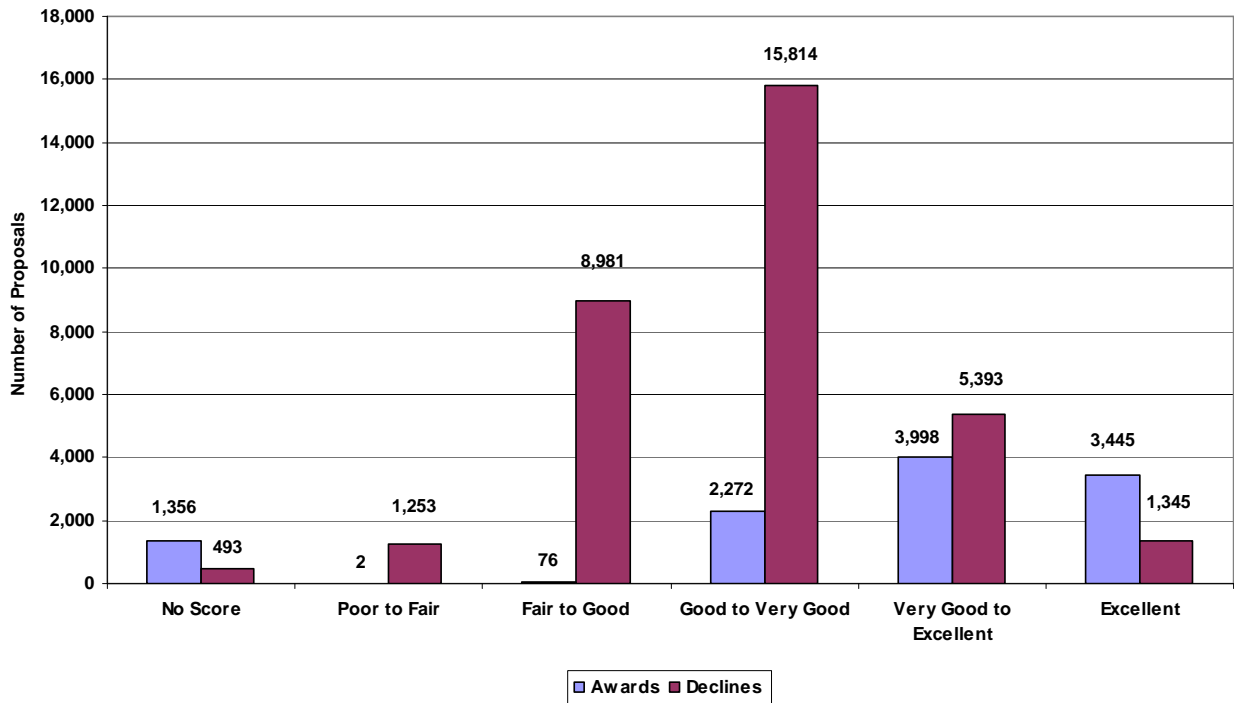
Reviewers are also identified through literature searches and professional activities such as workshops and conferences. Some NSF divisions actively solicit new reviewers through their web pages and outreach activities. To increase transparency, Chapter III.B of the *Grant Proposal Guide* describes how reviewers are selected by the NSF program officers.

Participation in the peer review process is voluntary. It brings with it increased familiarity with NSF programs, knowledge of the state of research and education nationally, and increased awareness of elements of a competitive proposal. Panelists are reimbursed for expenses, but mail reviewers receive no financial compensation. In FY 2008, NSF requested 60,373 mail reviews, of which there were 36,680 positive responses. This 61 percent response rate in FY 2008 is unchanged from FY 2007 and FY 2006 and up slightly from 60 percent in FY 2005 and 59 percent in FY 2004.

G. Reviewer Proposal Ratings and Impact of Budget Constraints

The NSF merit review system emphasizes reviewer narratives in addition to categorical ratings. The written comments provided by reviewers, the summary of panel discussions, and the expert opinions of program officers and division directors are important components of the merit review system. The distribution of average summary ratings of reviews for awarded and declined proposals is provided in **Figure 22**.

Figure 22
Distribution of Average Reviewer Ratings for Awards and Declined, FY2008



Source: NSF Enterprise Information System 10/2/08

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.⁹ **Appendices 13-13.2** 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).

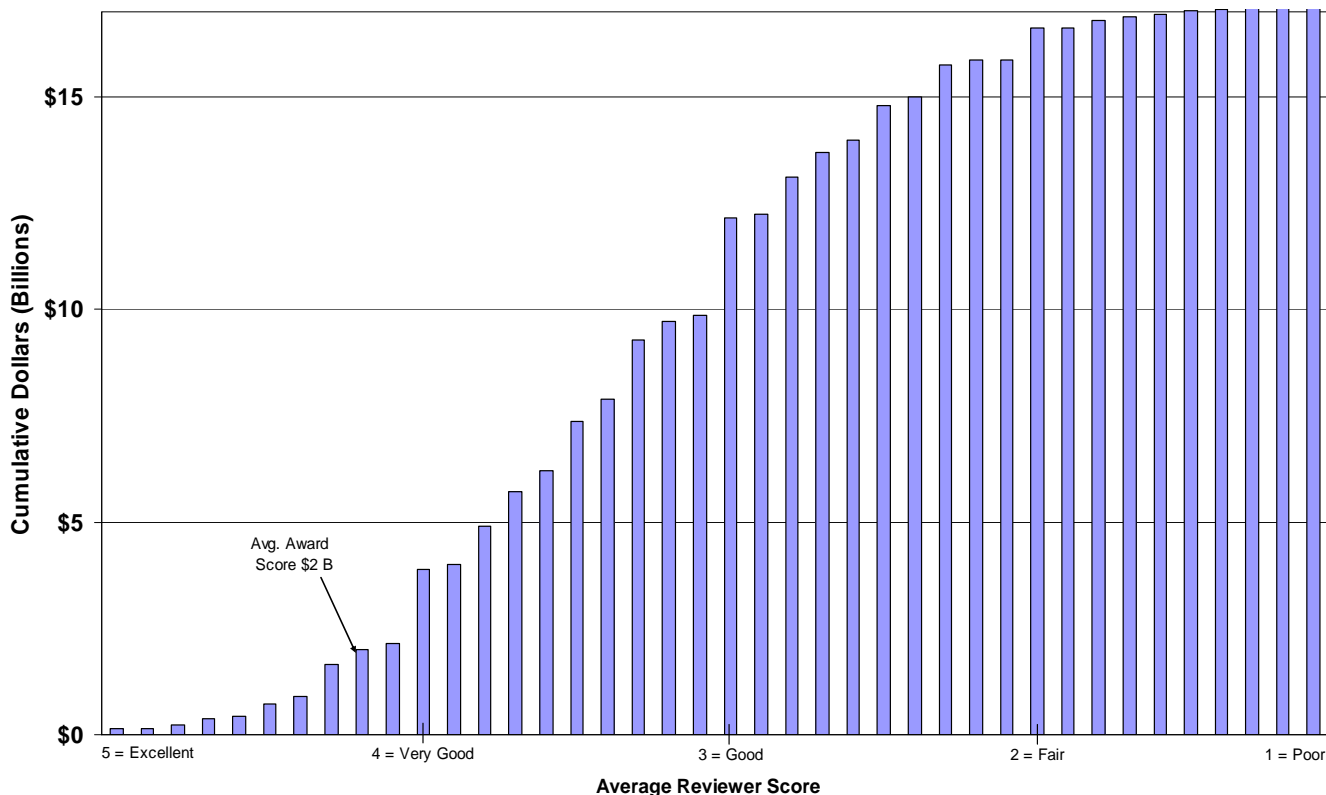
A large number of potentially fundable proposals are declined each year. As shown in **Figure 23**, approximately \$2.1 billion was requested for declined proposals that had received ratings at least as high as the average rating (4.2 out of 5.0) for all awarded proposals. Over the last ten years, NSF’s capacity to fund these highly rated proposals has diminished. In FY 1998, the ratio of awards to highly rated declines was 6:1; in FY 2008, that ratio had dropped to less than 4:1. NSF is thus supporting a smaller proportion of potentially fundable proposals. These declined proposals represent a rich portfolio of

⁹ 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” are those that are not externally reviewed.

unfunded opportunities, proposals that if funded may have produced substantial research and education benefits.

Figure 23

**Cumulative Requested Amounts for Declined Proposals
by Average Reviewer Score for FY 2008**



Source: NSF Enterprise Information System 10/2/08

H. Program Officer Characteristics and Workload

The number of program officers increased from 452 in FY 2007 to 520 in FY 2008, a 15 percent increase. Program officers can be permanent NSF employees or non-permanent employees. As indicated in **Figure 24**, 41 percent are permanent program officers and 59 percent are in 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 supported through grants to the home institutions under the terms of the Intergovernmental Personnel Act (IPA). Whether they are hired as temporary or permanent, incoming NSF program officers receive training in the merit review process.

Figure 24
Distribution of NSF Program Officers by Characteristics
As of October 1, 2008

Program Officers	Total	Percent*
Total	520	100%
<i>Gender</i>		
Male	334	64%
Female	186	36%
<i>Race</i>		
Minority	123	24%
White, Non-Hispanic	397	76%
<i>Employment</i>		
Permanent	215	41%
Visiting Scientists, Engineers & Educators (VSEE)	47	9%
Temporary	46	9%
Intergovernmental Personnel Act (IPA)	212	41%

Source: NSF Division of Human Resource Management

The number of proposals that the program officers handle has increased significantly over the last several years. In addition to the growing emphasis on interdisciplinary and cross-directorate programs, program officers are also tasked with an increasing number of programmatic activities, e.g., increased program accountability, outreach, mentoring new staff. Despite an increase in the overall number of program officers, workload concerns are still present and frequently highlighted by NSF's Committees of Visitors (see **Appendix 9**).

NSF has revitalized its professional development opportunities for program staff, offering in-house courses in project management, leadership, and communication through the NSF Academy. New NSF program staff attend the NSF Program Manager Seminar, which is a four-day off-site orientation to NSF and the merit review process.

I. America COMPETES Act, Section 7012

America COMPETES Act (Public Law 110-69) SEC. 7012: Funding for Successful Science, Technology, Engineering, and Mathematics Education Programs.

(a) *EVALUATION OF PROGRAMS.*—The Director shall, on an annual basis, evaluate all of the Foundation's grants that are scheduled to expire within 1 year and 1) that have the primary purpose of meeting the objectives of the Science and Engineering Equal Opportunity Act (42 U.S.C. 1885 et seq.); or (2) that have the primary purpose of providing teacher professional development.

(b) *CONTINUATION OF FUNDING.*—For grants that are identified under subsection (a) and that are determined by the Director to be successful in meeting the

objectives of the initial grant solicitation, the Director may extend the duration of those grants for not more than 3 additional years beyond their scheduled expiration without the requirement for a re-competition.

(c) REPORT TO CONGRESS.—Not later than 1 year after the date of enactment of this Act, and annually thereafter, the Director shall submit a report to the Committee on Science and Technology of the House of Representatives and to the Committee on Commerce, Science, and Transportation and the Committee on Health, Education, Labor, and Pensions of the Senate that (1) lists the grants that have been extended in duration by the authority provided under this section; and (2) provides any recommendations the Director may have regarding the extension of the authority provided under this section to programs other than those specified in subsection (a)

Currently, extensions for these grants are awarded after external and NSF staff review of proposals submitted to build on current grant. NSF staff are reviewing the files to determine whether all grants identified in part (a) considered successful were in fact awarded extensions through the competitive process. External review is furthermore considered critical in identifying those grants to extend. In FY 2008, the Director extended no grants under the provision provided in part (b) above of Section 7012.

J. Review of Committee of Visitors Reports

In July 2008, NSF Senior Management was briefed on a review of 99 Committee of Visitors (COV) Reports conducted from 2004 through 2007.

The review focused on the concerns raised in the COV Reports. Of the 99 reports, 63 commented on the review of the Broader Impact criterion. Concerns such as the following were raised: ambiguity in the definition of the broader impact criterion, panel reviews that lacked detail regarding the broader impact criterion, and reviewers that were not aware of the level of significance that the broader impact criterion should have in the review process.

About 14 percent of the COV reports raised concerns regarding poor panel summaries, noting that some panel reviews lacked consistency in terms of detail, scope, and approach. Workforce and funding issues were also raised in the COV reports. COVs commented on the increasing workload and recommended hiring additional program officers (15 percent) and support staff (12 percent) to ensure the quality of the merit review process. There were also suggestions in 17 percent of the COV reports to increase the number of permanent POs to enhance institutional memory at the Foundation. About 17 percent of the COV reports commented on the growing number of highly qualified proposals that are unfunded due to budgetary constraints.

Concerns raised in each COV reports are addressed by NSF and posted with the COV report on the NSF website at <http://www.nsf.gov/od/oia/activities/cov/> . The most current COV reports review findings of previous reports as well as the status of program actions in addressing prior concerns. In addition, NSF-wide activities also address many of these concerns (see Sec V.A.).

V. Special Activities on Merit Review Process

A. Quality and Transparency

The National Science Board was requested by Congress to conduct a review of the NSF merit review process. The Board issued its report in September 2005, concluding that the NSF merit review process is fair and effective, and “remains an international ‘gold standard’ for review of science and engineering research proposals.” The Board provided several recommendations for NSF to improve the transparency and effectiveness of the NSF merit review process, while preserving the ability of the program officers to identify the most innovative proposals and effectively diversify and balance NSF's research and education portfolio.¹⁰

In response to the Board's recommendations, NSF has undertaken an agency-wide effort to address quality of reviews, transparency of the award/decline decision, and support of potentially transformational research. The FY 2006 and 2007 merit review reports provided updates of the activities undertaken in those fiscal years.

The activities listed below provide an update of accomplishments and additional activities conducted in FY 2008.

- An internal NSF web page that will provide information on the merit review process to NSF staff is in final production stages before release. The proposed site has undergone extensive revisions during the review process. A complementary external site was released in FY 2007 and can be found at <http://www.nsf.gov/bfa/dias/policy/meritreview/>
- In FY 2007, the NSF Senior Management decided to initiate a seminar to promote quality and transparency in the merit review process. The seminar will be required of all NSF staff involved in the merit review of proposals (e.g., program officers and division directors). The pilot stage for the seminar has been completed and plans are in place to begin providing the seminar in FY 2009.
- In FY 2008, a review of recommendations and findings in Committee of Visitors reports was completed. A summary of the findings of this review conducted in FY 2008 can be found in Section IV.J. This review of Committee of Visitors reports will be conducted on an annual basis.
- The NSF Working Group on Facilitating Transformative and Interdisciplinary Research (see Section V.C.) has made several recommendations in the merit review process to promote the support of meritorious potentially transformative or interdisciplinary proposals.
- The Director's Award for Merit Review Excellence, which was initiated in FY 2006, has continued annually with the most recent awardees recognized at the Annual Director's Award Ceremony in June 2008.

¹⁰ *Report of the National Science Board on the National Science Foundation's Merit Review System*, NSB-05-119. Available on the web at http://www.nsf.gov/nsb/documents/2005/0930/merit_review.pdf.

B. Impact of Proposal and Award Management Mechanisms (IPAMM)

In March 2006, NSF charged the Impact of Proposal and Award Management Mechanisms (IPAMM) working group to perform a detailed study of the trends, impacts, and causal factors associated with what was then declines in proposal funding rates and the simultaneous growth in proposal submission rates.

In conducting its analysis, IPAMM used both quantitative data from internal NSF databases and attitudinal data collected through a survey of all PIs who submitted research proposals during the FY 2004-2006 period. IPAMM published its final report (NSF 07-45) in August 2007; the report and the results of the 2007 NSF Proposer Survey can both be found on the IPAMM web page (<http://www.nsf.gov/od/ipamm/ipamm.jsp>).

The IPAMM report concluded that increases in the overall NSF budget were absorbed by the growth in the average award size, leaving little flexibility to respond to growing proposal submissions. The overall growth in proposal submissions was due to a variety of factors, including an increase in the size and capacity of the S&E enterprise (both infrastructure and workforce), loss of funding from other sources, increased use of targeted solicitations by NSF, and an increase in the external institutional pressures being exerted on the PIs. Some of these factors resulted in an increase in the applicant pool and some resulted in an increase in the number of proposals submitted per applicant. The relative importance of these factors varied for different communities, which impacts directorate portfolio management.

The IPAMM report also concluded that declining funding rates had affected the entire NSF proposer community, but that there had been no disparate effect on beginning investigators, underrepresented groups, or different institution types. Further, IPAMM found that the quality of the proposals being submitted had not deteriorated, although more high-quality proposals were being declined. However, the increased number of proposals being submitted has put stress on NSF's merit review process. Analysis of NSF data showed that individual reviewers are reviewing an increased number of proposals. The attitudinal data from the survey indicated that some reviewers are spending less time on their reviews and/or are simply declining to review proposals or serve on panels.

The IPAMM report endorsed the limited and responsible use of a variety of practices to help break the decline-revise-resubmit cycle, and the practice of limiting proposal submissions under certain circumstances to help manage the number of proposals received. The report also encouraged improved communications with internal and external communities when implementing new management practices. In the past year, NSF has implemented several of the recommendations in the IPAMM report, as follows:

- To improve accessibility to sources of accurate NSF funding rate data to external communities, NSF has placed a *Funding Trend* link on its homepage that gives access to the Budget Internet Information System (BIIS), which is NSF's official source of funding rate data, and has added links to a variety of reports related to funding rates on the BIIS home page. In addition, division-level funding rate data can be found on the home pages for each directorate.

- This annual Merit Review Report has been expanded to incorporate several of the trends analyses first described in the IPAMM report.
- The *Proposal and Award Manual*, NSF's internal policy document, was revised to include a requirement that management plans for solicitations that limit proposal submissions provide the rationale for imposing the limit.

Finally, because the needs and priorities of the communities that NSF serves differ across units, and also across time within units, the IPAMM report recommended flexibility in developing strategies that are appropriate within the context of various directorates or offices, and that balance long-term planning with the ability to respond to changing needs. To assist the directorates and offices in understanding which issues are most significant to their communities, in FY 2008, NSF began a follow-on analysis of the data associated with the 2007 NSF Proposer Survey, to provide directorate and division-level attitudinal data on issues related to the NSF merit review and proposal funding rates. These data will be provided to the directorates to aid long-term planning of research-related activities that will also accommodate growth of new communities and infrastructure.

C. Transformative and Interdisciplinary Research

The NSF Director and Deputy Director formed an NSF-wide Working Group on Facilitating Transformative and Interdisciplinary Research. The Working Group was charged to 1) develop new funding mechanisms to facilitate potentially transformative research, and 2) recommend policies and best practices to facilitate transformative and interdisciplinary research. The Working Group has completed the first task with inclusion in the January 2009 version of the *Grant Proposal Guide* of two new funding mechanisms: EAGER (Early-concept Grants for Exploratory Research) and RAPID (grants for rapid response research).

- The EAGER funding mechanism may be used to support exploratory work in its early stages on untested, but potentially transformative, research ideas or approaches. This work may be considered especially "high risk-high payoff" in the sense that it, for example, involves radically different approaches, applies new expertise, or engages novel disciplinary or interdisciplinary perspectives. These exploratory proposals may also be submitted directly to an NSF program, but the EAGER mechanism should not be used for projects that are appropriate for submission as "regular" (i.e., non-EAGER) NSF proposals. PI(s) must contact the NSF program officer(s) whose expertise is most germane to the proposal topic prior to submission of an EAGER proposal. This will aid in determining the appropriateness of the work for consideration under the EAGER mechanism; this suitability must be assessed early in the process.
- The RAPID funding mechanism is used for proposals having a severe urgency with regard to availability of, or access to data, facilities or specialized equipment, including quick-response research on natural or anthropogenic disasters and similar unanticipated events. PI(s) must contact the NSF program officer(s) whose expertise is most germane to the proposal topic before submitting a RAPID proposal. This will facilitate determining whether the proposed work is appropriate for RAPID funding.

NSF has a variety of programs that support potentially transformative and interdisciplinary research. These include proposals submitted in response to targeted solicitations and proposals submitted to core funding programs. The working group is also developing training materials for NSF program directors and communications materials for the scientific and engineering community addressing NSF's approach to supporting both potentially transformative and interdisciplinary research.

VI. Appendices

Appendix 1

Proposals, Awards and Funding Rates by Directorate & Office

		Fiscal Year							
		2001	2002	2003	2004	2005	2006	2007	2008
NSF	Proposals	31,942	35,165	40,075	43,851	41,722	42,352	44,577	44,428
	Awards	9,925	10,406	10,844	10,380	9,757	10,425	11,463	11,149
	Funding Rate	31%	30%	27%	24%	23%	25%	26%	25%
BIO	Proposals	5,131	5,143	5,591	6,063	6,475	6,617	6,728	6,598
	Awards	1,431	1,400	1,448	1,432	1,355	1,202	1,303	1,291
	Funding Rate	28%	27%	26%	24%	21%	18%	19%	20%
CSE	Proposals	3,578	4,317	5,270	6,276	5,238	4,843	5,744	5,567
	Awards	884	1,039	1,175	1,017	1,088	1,280	1,631	1,352
	Funding Rate	24%	24%	22%	16%	21%	26%	28%	24%
EHR	Proposals	3,449	3,966	4,111	4,644	3,699	3,254	4,248	3,887
	Awards	1,157	1,044	890	925	736	824	903	1,111
	Funding Rate	34%	26%	22%	20%	20%	25%	21%	29%
ENG	Proposals	5,983	6,883	9,076	8,994	8,692	9,423	9,574	9,643
	Awards	1,426	1,726	1,945	1,753	1,493	1,730	1,955	1,966
	Funding Rate	24%	25%	21%	19%	17%	18%	20%	20%
GEO	Proposals	3,580	4,114	4,230	4,267	4,676	4,603	4,367	4,237
	Awards	1,417	1,450	1,515	1,419	1,315	1,418	1,341	1,328
	Funding Rate	40%	35%	36%	33%	28%	31%	31%	31%
MPS	Proposals	5,692	5,996	6,694	7,184	7,083	7,466	7,315	7,837
	Awards	1,996	2,105	2,268	2,175	2,071	2,221	2,360	2,269
	Funding Rate	35%	35%	34%	30%	29%	30%	32%	29%
OCI	Proposals	288	223	342	220	116	130	304	500
	Awards	39	54	56	47	75	42	68	97
	Funding Rate	14%	24%	16%	21%	65%	32%	22%	19%
OISE	Proposals	610	608	670	851	822	712	776	910
	Awards	358	334	373	386	333	319	353	357
	Funding Rate	59%	55%	56%	45%	41%	45%	45%	39%
OPP	Proposals	634	572	557	689	816	775	1,200	864
	Awards	201	264	241	268	281	238	370	235
	Funding Rate	32%	46%	43%	39%	34%	31%	31%	27%
SBE	Proposals	2,900	3,279	3,491	4,619	4,089	4,520	4,284	4,364
	Awards	942	931	894	939	1,004	1,144	1,143	1,126
	Funding Rate	32%	28%	26%	20%	25%	25%	27%	26%
Other	Proposals	97	64	12	44	16	9	37	21
	Awards	74	59	12	19	6	7	36	17
	Funding Rate	76%	92%	100%	43%	38%	78%	97%	81%

Source: NSF Enterprise Information System 10/2/08

Note: The majority of the proposals included in the 'Other' category are managed by the Office of Integrated Activities (OIA). Note: In FY 2007, management of the EPSCoR program was transferred from EHR to OIA. The following are not included in the above statistics: 8,177 Continuing Grant Increments, 3,360 Supplements, and 338 Contracts.

Appendix 2

Preliminary Proposals

Several NSF programs utilize preliminary proposals in an effort to limit the workload of PIs and to increase the quality of full proposals. The annual number of preliminary proposals varies considerably as a result of competitions being held in a given year. For some programs, preliminary proposals are externally reviewed; other programs provide internal review only.

Decisions regarding preliminary proposals may be non-binding or binding. Non-Binding decisions regarding preliminary proposals are recommendations. A PI may choose to submit a full proposal even if it has been discouraged. Binding decisions, however, are restrictive in that non-invited PIs are not allowed to submit a full proposal.

Number of Preliminary Proposals and Subsequent Actions

Fiscal Year	2001	2002	2003	2004	2005	2006	2007	2008
Total # Preliminary Proposals	2,183	1,747	2,469	2,310	2,120	1,874	2,842	3,203
Non-Binding (NB) Total	2,107	1,184	1,924	1,412	1,302	1,279	1,540	669
NB Encouraged	940	665	669	544	512	509	662	333
NB Discouraged	1,167	519	1,255	868	790	770	878	336
Binding Total		540	534	892	816	594	1,301	2,534
Binding Invite		168	152	221	246	136	252	572
Binding Non-invite		372	382	671	570	458	1,049	1,962

Note: Non-binding and binding totals do not include withdrawn preliminary proposals
Source: NSF Enterprise Information System 10/2/08

Appendix 3

Proposals, Awards and Funding Rates by PI Characteristics

		Fiscal Year							
		2001	2002	2003	2004	2005	2006	2007	2008
American Indian/Alaska Native	Proposals	118	100	112	93	94	93	80	82
	Awards	52	30	28	23	24	30	28	21
	Funding Rate	44%	30%	25%	25%	26%	32%	35%	26%
Black/ African American	Proposals	668	748	822	900	813	881	992	965
	Awards	180	207	192	208	193	197	234	239
	Funding Rate	27%	28%	23%	23%	24%	22%	24%	25%
Hispanic or Latino	Proposals	955	1,041	1,191	1,432	1,436	1,483	1,591	1,590
	Awards	285	300	342	347	322	374	418	381
	Funding Rate	30%	29%	29%	24%	22%	25%	26%	24%
Native Hawaiian/ Pacific Island	Proposals	23	32	37	47	21	25	24	30
	Awards	6	7	12	4	4	7	4	7
	Funding Rate	26%	22%	32%	9%	19%	28%	17%	23%
Asian	Proposals	4,582	5,509	6,895	7,618	7,253	7,821	8,622	8,847
	Awards	1,077	1,195	1,445	1,382	1,278	1,507	1,776	1,762
	Funding Rate	24%	22%	21%	18%	18%	19%	21%	20%
White, Not of Hispanic Origin	Proposals	23,886	25,288	28,081	30,251	28,752	28,645	29,318	28,842
	Awards	7,814	7,985	8,130	7,713	7,305	7,568	8,103	7,815
	Funding Rate	33%	32%	29%	25%	25%	26%	28%	27%

Source: NSF Enterprise Information System 10/2/08.

Appendix 4

Median and Average Award Amounts for Research Grants By Directorate or Office (in Thousands)

		Fiscal Year							
		2001	2002	2003	2004	2005	2006	2007	2008
NSF	Median	\$84	\$86	\$100	\$102	\$104	\$102	\$110	\$110
	Average	\$114	\$116	\$136	\$140	\$144	\$135	\$146	\$143
BIO	Median	\$108	\$110	\$126	\$133	\$140	\$140	\$142	\$150
	Average	\$144	\$137	\$177	\$171	\$184	\$191	\$182	\$180
CSE	Median	\$92	\$94	\$113	\$113	\$112	\$117	\$115	\$117
	Average	\$130	\$136	\$159	\$167	\$151	\$146	\$139	\$165
ENG	Median	\$81	\$84	\$100	\$97	\$97	\$90	\$100	\$100
	Average	\$100	\$102	\$119	\$120	\$117	\$110	\$116	\$112
GEO	Median	\$77	\$80	\$103	\$115	\$116	\$110	\$120	\$118
	Average	\$99	\$103	\$146	\$150	\$148	\$149	\$154	\$150
MPS	Median	\$86	\$83	\$100	\$100	\$100	\$100	\$106	\$105
	Average	\$114	\$112	\$129	\$130	\$135	\$120	\$130	\$133
OCI	Median	\$75	\$125	\$134	\$365	\$161	\$253	\$450	\$179
	Average	\$83	\$176	\$160	\$402	\$315	\$287	\$512	\$217
OISE	Median	\$9	\$10	\$10	\$10	\$15	\$33	\$47	\$30
	Average	\$17	\$16	\$21	\$15	\$91	\$59	\$157	\$29
OPP	Median	\$78	\$82	\$126	\$141	\$122	\$132	\$167	\$148
	Average	\$113	\$130	\$144	\$204	\$180	\$150	\$238	\$187
SBE	Median	\$63	\$63	\$77	\$78	\$84	\$85	\$94	\$100
	Average	\$81	\$78	\$89	\$90	\$110	\$103	\$115	\$116

Source: NSF Enterprise Information System 10/2/08

Note: EHR is not included in this appendix since the number of awards included in the 'research grant' category is small relative to the number of education awards managed by that directorate.

Appendix 5

Average Number of Months of Salary Support for Single- and Multi-PI Research Grants, by Directorate or Office

Directorate or Office	Type of Award	2001	2002	2003	2004	2005	2006	2007	2008
NSF	Multi-PI Grants	2.7	2.6	2.6	2.5	2.4	2.4	2.3	2.1
	Single-PI Grants	2.8	3.0	2.9	2.9	2.8	2.7	2.6	2.4
	NSF Average	2.8	2.9	2.8	2.7	2.6	2.6	2.5	2.3
BIO	Multi-PI Grants	4.0	4.1	4.3	3.8	3.7	3.6	3.5	3.1
	Single-PI Grants	3.0	3.8	3.7	3.6	3.7	3.5	3.3	2.7
	BIO Average	3.3	3.9	3.9	3.6	3.7	3.6	3.3	2.9
CSE	Multi-PI Grants	2.6	1.9	1.8	1.8	1.7	1.6	1.6	1.4
	Single-PI Grants	2.6	2.4	2.3	2.1	1.9	2.0	2.0	1.9
	CSE Average	2.6	2.2	2.0	1.9	1.8	1.8	1.8	1.7
EHR	Multi-PI Grants	4.2	5.1	3.7	3.0	3.0	3.0	2.9	2.6
	Single-PI Grants	4.2	4.4	3.8	3.5	3.4	3.0	2.4	2.5
	EHR Average	4.2	4.7	3.8	3.2	3.1	3.0	2.7	2.5
ENG	Multi-PI Grants	2.1	2.0	1.9	1.8	1.8	1.7	1.7	1.6
	Single-PI Grants	2.2	2.5	2.6	2.7	2.6	2.6	3.2	2.7
	ENG Average	2.2	2.3	2.3	2.3	2.2	2.1	2.4	2.2
GEO	Multi-PI Grants	2.8	3.0	3.1	3.1	3.0	2.9	2.9	2.8
	Single-PI Grants	2.9	3.1	3.2	3.1	2.9	2.7	2.8	2.6
	GEO Average	2.9	3.1	3.2	3.1	2.9	2.8	2.9	2.7
MPS	Multi-PI Grants	2.0	2.1	2.1	2.2	2.2	2.2	2.0	2.0
	Single-PI Grants	2.9	2.8	2.7	2.7	2.7	2.6	2.4	2.2
	MPS Average	2.8	2.7	2.6	2.6	2.6	2.5	2.3	2.2
OCI	Multi-PI Grants	1.7	5.3	4.4	5.0	3.9	2.9	3.4	3.0
	Single-PI Grants	2.0	3.6	4.0	5.9	4.8	3.9	5.6	5.0
	OCI Average	1.9	4.6	4.3	5.2	4.1	3.1	3.7	3.3
OISE	Multi-PI Grants	7.6	7.0	1.6	2.7	2.6	2.3	1.3	0.9
	Single-PI Grants	4.5	4.4	4.6	4.8	5.2	3.3	2.3	4.6
	OISE Average	5.5	5.3	3.5	4.1	3.6	2.7	1.4	1.2
OPP	Multi-PI Grants	3.3	3.5	3.2	3.4	3.3	3.6	3.3	2.9
	Single-PI Grants	2.7	2.8	2.9	3.2	3.5	3.3	3.3	2.9
	OPP Average	2.9	3.1	3.1	3.3	3.4	3.5	3.3	2.9
SBE	Multi-PI Grants	2.6	2.8	2.5	2.2	2.1	1.9	1.8	1.7
	Single-PI Grants	3.5	3.7	3.3	3.1	3.0	2.9	2.5	2.5
	SBE Average	3.2	3.4	3.0	2.7	2.6	2.4	2.2	2.1

Source: NSF Enterprise Information System 10/2/08

Note: The NSF, directorate, or office average is weighted by the number of single and multiple PI awards.

Appendix 6

Number of People Involved in NSF Activities

In FY 2008, an estimated 197,000 senior researchers, post-doctoral associates, teachers and students across all levels were directly involved in NSF research and education programs and activities.

	FY 2008 Estimate
Senior Researchers	43,000
Other Professionals	12,000
Postdoctoral Associates	6,000
Graduate Students	37,000
Undergraduate Students	24,000
K-12 Students	13,000
K-12 Teachers	62,000
Total, Number of People	197,000

Source: NSF FY 2010 Budget Request

In addition, NSF programs indirectly impact many millions of people. These programs reach K-12 students, K-12 teachers, the general public, and researchers. Outreach activities include workshops, activities at museums, television, educational videos, journal articles, and dissemination of improved curriculum and teaching methods.

Appendix 7

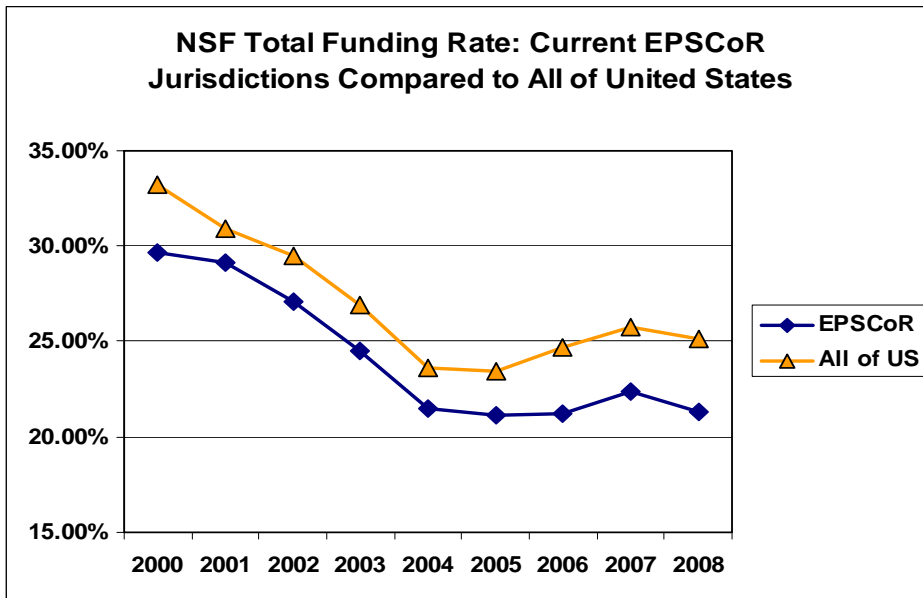
EPSCoR: Jurisdictions, Proposal, Award, and Funding Data

Twenty-five states, the Commonwealth of Puerto Rico, and the U.S. Virgin Islands are currently eligible to compete in the NSF EPSCoR program. The states are: Alabama, Alaska, Arkansas, Delaware, Hawaii, Idaho, Kansas, Kentucky, Louisiana, Maine, Mississippi, Montana, Nebraska, Nevada, New Hampshire, New Mexico, North Dakota, Oklahoma, Rhode Island, South Carolina, South Dakota, Tennessee, Vermont, West Virginia, and Wyoming.

The Figure 7.1 shows the change over time for the funding rate of EPSCoR jurisdictions relative to the overall funding rate for all of the United States. Figure 7.2 indicates, as a percentage of the overall NSF budget, the change in funding received by each of the EPSCoR jurisdictions, comparing their first three years in EPSCoR to the most recent three-year time period (FY 2006-2008). Table 7.3 shows the funding data for each EPSCoR jurisdiction (the year the jurisdiction joined EPSCoR is shown below the name of that jurisdiction).

Figure 7.1

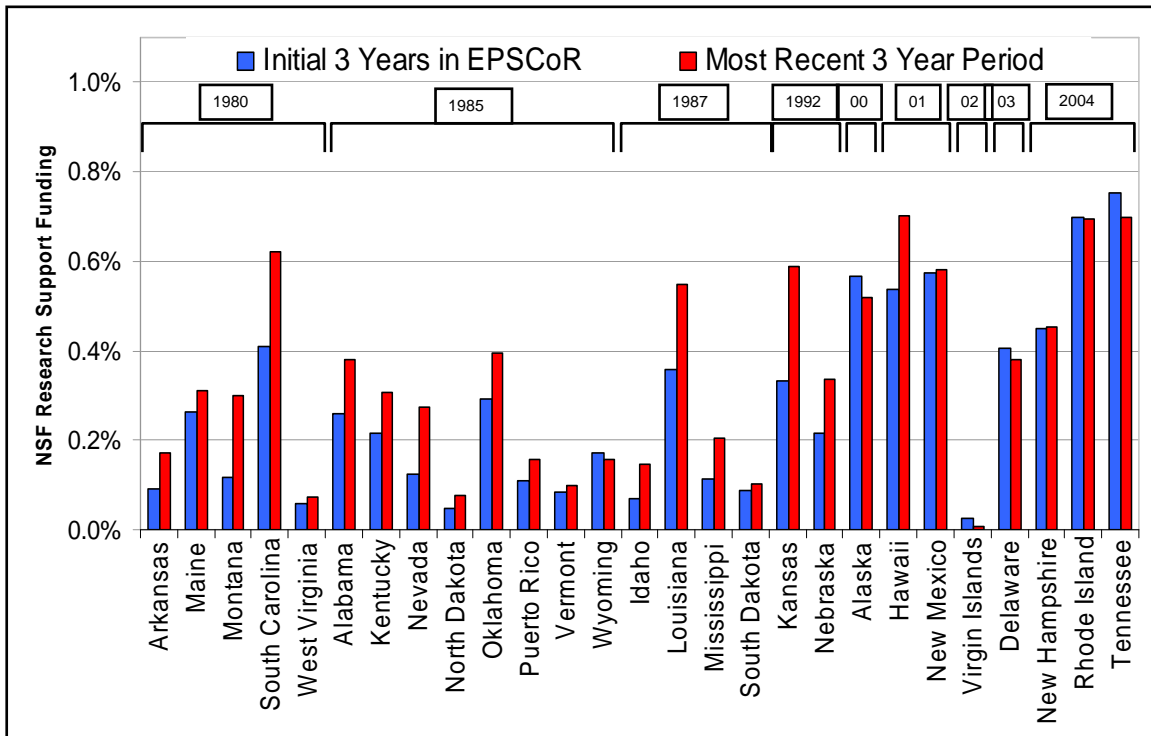
Overall Funding Rates for EPSCoR Jurisdictions



Source: NSF Budget Internet Information System (BIIS)

Figure 7.2

Funding to EPSCoR Jurisdictions as Percentage of the NSF Budget: Initial 3 Years in EPSCoR and Most Recent (FY 2006-08) 3-Year Period



Sources: NSF Budget Internet Information System (BIIS) and NSF Report Database

* NSF Research Support data are adjusted in cases where a single large award or facility skew the data

Table 7.3:

Funding Rates by EPSCoR Jurisdiction

(Date under the state name is year state joined EPSCoR)

		2001	2002	2003	2004	2005	2006	2007	2008
All NSF	Awards	9,925	10,339	10,798	10,367	9,772	10,450	11,484	11,162
	Proposals	31,942	35,082	40,084	43,816	41,723	42,374	44,593	44,438
	Funding Rate	31%	29%	27%	24%	23%	25%	26%	25%
All EPSCoR Jurisdictions	Awards	1,505	1,511	1,567	1,454	1,433	1,489	1,653	1,564
	Proposals	5,172	5,595	6,418	6,815	6,802	7,037	7,392	7,349
	Funding Rate	29%	27%	24%	21%	21%	21%	22%	21%
Alabama	Awards	81	82	81	99	78	84	86	85
-1985	Proposals	323	385	443	488	483	530	508	489
	Funding Rate	25%	21%	18%	20%	16%	16%	17%	17%
Alaska	Awards	69	37	74	63	52	63	75	52
-2000	Proposals	164	132	200	211	203	209	246	204
	Funding Rate	42%	28%	37%	30%	26%	30%	30%	25%
Arkansas	Awards	34	38	43	45	29	47	58	36
-1980	Proposals	110	186	201	236	191	209	244	197
	Funding Rate	31%	20%	21%	19%	15%	22%	24%	18%
Delaware	Awards	48	49	64	50	54	50	67	68
-2003	Proposals	183	194	239	266	254	247	283	283
	Funding Rate	26%	25%	27%	19%	21%	20%	24%	24%
Hawaii	Awards	64	71	71	66	89	77	74	73
-2001	Proposals	181	216	247	252	265	240	276	276
	Funding Rate	35%	33%	29%	26%	34%	32%	27%	26%
Idaho	Awards	29	27	33	24	31	29	34	44
-1987	Proposals	122	130	153	148	140	148	161	201
	Funding Rate	24%	21%	22%	16%	22%	20%	21%	22%
Kansas	Awards	87	74	79	70	88	76	78	82
-1992	Proposals	324	329	338	388	367	393	404	387
	Funding Rate	27%	22%	23%	18%	24%	19%	19%	21%
Kentucky	Awards	84	71	66	72	62	52	60	62
-1985	Proposals	268	266	298	337	307	293	330	300
	Funding Rate	31%	27%	22%	21%	20%	18%	18%	21%
Louisiana	Awards	95	95	98	107	100	117	96	98
-1987	Proposals	383	375	455	517	514	548	495	471
	Funding Rate	25%	25%	22%	21%	19%	21%	19%	21%
Maine	Awards	66	76	53	41	50	36	58	65
-1980	Proposals	181	189	190	197	192	181	200	199
	Funding Rate	36%	40%	28%	21%	26%	20%	29%	33%
Mississippi	Awards	35	51	33	43	32	48	40	34
-1987	Proposals	131	152	181	238	226	293	251	271
	Funding Rate	27%	34%	18%	18%	14%	16%	16%	13%
Montana	Awards	55	43	67	54	43	52	61	57
-1980	Proposals	141	136	189	194	193	242	238	232
	Funding Rate	39%	32%	35%	28%	22%	21%	26%	25%
Nebraska	Awards	50	48	44	52	41	59	51	54
-1992	Proposals	203	201	233	242	226	238	250	255
	Funding Rate	25%	24%	19%	21%	18%	25%	20%	21%

		2001	2002	2003	2004	2005	2006	2007	2008
Nevada	Awards	36	40	45	31	40	42	50	43
-1985	Proposals	159	176	160	159	203	200	231	261
	Funding Rate	23%	23%	28%	19%	20%	21%	22%	16%
New Hampshire	Awards	64	68	67	53	64	53	60	58
-2004	Proposals	165	200	244	232	280	243	240	230
	Funding Rate	39%	34%	27%	23%	23%	22%	25%	25%
New Mexico	Awards	96	101	117	90	80	91	104	102
-2001	Proposals	332	355	406	378	352	348	401	444
	Funding Rate	29%	28%	29%	24%	23%	26%	26%	23%
North Dakota	Awards	21	30	29	20	19	22	15	19
-1985	Proposals	105	127	127	140	154	170	139	158
	Funding Rate	20%	24%	23%	14%	12%	13%	11%	12%
Oklahoma	Awards	75	73	61	65	55	74	66	67
-1985	Proposals	258	270	302	338	327	342	338	378
	Funding Rate	29%	27%	20%	19%	17%	22%	20%	18%
Puerto Rico	Awards	26	18	20	20	16	19	32	24
-1985	Proposals	87	82	115	106	119	140	153	148
	Funding Rate	30%	22%	17%	19%	13%	14%	21%	16%
Rhode Island	Awards	99	106	105	128	117	140	127	129
-2004	Proposals	279	297	291	340	334	353	390	357
	Funding Rate	35%	36%	36%	38%	35%	40%	33%	36%
South Carolina	Awards	86	101	110	80	90	86	122	87
-1980	Proposals	345	382	472	452	453	464	523	470
	Funding Rate	25%	26%	23%	18%	20%	19%	23%	19%
South Dakota	Awards	28	24	23	12	21	14	21	20
-1987	Proposals	78	99	86	93	101	97	97	116
	Funding Rate	36%	24%	27%	13%	21%	14%	22%	17%
Tennessee	Awards	91	115	111	102	113	99	145	124
-2004	Proposals	371	440	521	540	585	564	642	633
	Funding Rate	25%	26%	21%	19%	19%	18%	23%	20%
U.S. Virgin Islands	Awards	3	3	0	2	2	1	0	27
-2002	Proposals	5	3	1	6	5	6	4	144
	Funding Rate	60%	100%	0%	33%	40%	17%	0%	19%
Vermont	Awards	31	22	24	21	22	16	26	2
-1985	Proposals	81	81	113	111	129	119	129	5
	Funding Rate	38%	27%	21%	19%	17%	13%	20%	40%
West Virginia	Awards	24	24	18	17	16	19	21	25
-1980	Proposals	104	107	111	105	100	121	128	119
	Funding Rate	23%	22%	16%	16%	16%	16%	16%	21%
Wyoming	Awards	28	31	31	27	29	23	26	27
-1985	Proposals	89	102	102	101	99	99	91	121
	Funding Rate	31%	30%	30%	27%	29%	23%	29%	22%

Source: NSF Budget Internet Information System (BIIS)

Appendix 8

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 certain 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 and potentially transformative research ideas;
- application of new expertise or new approaches to "established" research topics;
- having a severe urgency with regard to availability of, or access to data, facilities or specialized equipment, including quick-response research on natural or anthropogenic disasters and similar unanticipated events; or
- efforts of similar character likely to catalyze rapid and innovative advances.

The maximum SGER award size was \$200,000, and program officers were allowed to obligate up to five percent of their program budget per fiscal year for SGER awards.

Potential SGER applicants were 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 the table in **Appendix 8.1** (below). The number of SGER proposals may be impacted significantly by a major disaster. For example, the increase of SGER proposals in FY 2006 is in large part due to the number of SGERs awarded to collect ephemeral data immediately following Hurricane Katrina.

NSF initiated a study of the SGER portfolio in FY 2006 to determine the effectiveness and impact of the SGER mechanism. Preliminary results of the study of organizational practice were provided in FY 2007. Additional time was required to resolve privacy issues before a survey study of awardees could commence. Data collection has begun and the final results are expected in FY 2009.

Effective January 2009, the SGER funding mechanism was replaced by two funding mechanisms EAGER and RAPID, in part to emphasize the importance of funding of both potentially transformative research and research requiring an urgent response. See Section V (c) for additional information about EAGER and RAPID.

Appendix 8.1

Small Grants for Exploratory Research (SGER) Funding Trends by Directorate or Office

		Fiscal Year							
		2001	2002	2003	2004	2005	2006	2007	2008
NSF	Proposals	301	323	435	640	504	697	469	438
	Awards	256	278	344	382	387	472	410	389
	Total \$ (In Millions)	\$15.4	\$16.7	\$23.4	\$29.5	\$27.0	\$40.0	\$34.8	\$34.2
	% of Obligations	0.4%	0.4%	0.4%	0.5%	0.5%	0.7%	0.6%	0.6%
	Average \$ (In Thousands)	\$60	\$60	\$68	\$77	\$70	\$85	\$85	\$88
BIO	Proposals	59	58	52	65	55	55	29	29
	Awards	40	40	48	52	38	49	26	23
	Total \$ (In Millions)	\$2.7	\$2.7	\$3.4	\$5.4	\$3.0	\$54.0	\$2.7	\$2.3
	% of Obligations	0.5%	0.5%	0.6%	0.9%	0.5%	0.9%	0.4%	0.4%
	Average \$ (In Thousands)	\$68	\$68	\$71	\$104	\$79	\$1,102	\$104	\$98
CSE	Proposals	25	26	59	51	82	89	136	104
	Awards	21	24	51	48	71	88	136	102
	Total \$ (In Millions)	\$1.6	\$1.8	\$3.9	\$3.2	\$6.7	\$10.2	\$14.6	\$10.4
	% of Obligations	0.3%	0.4%	0.8%	0.6%	1.4%	2.0%	2.7%	1.9%
	Average \$ (In Thousands)	\$76	\$75	\$76	\$67	\$94	\$116	\$107	\$102
EHR	Proposals	13	14	6	17	15	16	7	9
	Awards	13	10	5	16	11	16	7	9
	Total \$ (In Millions)	\$1.0	\$1.0	\$0.4	\$2.1	\$1.5	\$0.8	\$0.9	\$1.7
	% of Obligations	0.1%	0.1%	0.1%	0.2%	0.2%	0.1%	0.1%	0.2%
	Average \$ (In Thousands)	\$77	\$100	\$80	\$131	\$136	\$50	\$129	\$188
ENG	Proposals	84	88	128	127	176	180	134	125
	Awards	79	83	110	119	126	145	89	104
	Total \$ (In Millions)	\$5.1	\$5.7	\$7.5	\$8.1	\$6.7	\$11.2	\$5.8	\$7.6
	% of Obligations	1.1%	1.1%	1.3%	1.4%	1.1%	1.8%	0.9%	1.1%
	Average \$ (In Thousands)	\$65	\$69	\$68	\$68	\$53	\$77	\$65	\$73
GEO	Proposals	50	46	62	68	62	83	85	67
	Awards	49	43	60	64	59	79	81	64
	Total \$ (In Millions)	\$2.3	\$1.5	\$2.9	\$3.5	\$3.4	\$4.4	\$4.8	\$3.5
	% of Obligations	0.4%	0.2%	0.4%	0.4%	0.5%	0.5%	0.6%	0.5%
	Average \$ (In Thousands)	\$47	\$35	\$48	\$55	\$58	\$56	\$59	\$55
MPS	Proposals	25	32	97	272	21	39	39	58
	Awards	12	21	43	45	18	31	34	45
	Total \$ (In Millions)	\$0.8	\$1.8	\$3.8	\$4.4	\$1.7	\$2.6	\$3.5	\$5.4
	% of Obligations	0.1%	0.2%	0.3%	0.4%	0.1%	0.2%	0.3%	0.4%
	Average \$ (In Thousands)	\$67	\$86	\$88	\$98	\$94	\$84	\$103	\$121
OCI	Proposals	0	0	0	0	11	2	1	7
	Awards	0	0	0	0	11	2	1	7
	Total \$ (In Millions)	\$0.00	\$0.00	\$0.1	\$1.0	\$1.5	\$0.2	\$0.2	\$1.0
	% of Obligations	0.0%	0.0%	0.0%	0.8%	1.2%	0.1%	0.1%	0.5%
	Average \$ (In Thousands)	N/A	N/A	N/A	N/A	\$136	\$100	\$200	\$140
OISE	Proposals	1	0	0	0	0	0	0	0
	Awards	1	0	0	0	0	0	0	0
	Total \$ (In Millions)	\$0.04	\$0.04	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1
	% of Obligations	0.0%	0.0%	0.1%	0.2%	0.2%	0.3%	0.2%	0.2%
	Average \$ (In Thousands)	\$40	N/A	N/A	N/A	N/A	N/A	N/A	N/A

		Fiscal Year							
		2001	2002	2003	2004	2005	2006	2007	2008
OPP	Proposals	17	17	14	18	24	16	23	17
	Awards	15	16	13	16	24	16	23	15
	Total \$ (In Millions)	\$0.7	\$0.7	\$0.7	\$0.7	\$1.2	\$0.5	\$1.2	\$1.0
	% of Obligations	0.2%	0.2%	0.2%	0.2%	0.3%	0.1%	0.3%	0.2%
	Average \$ (In Thousands)	\$47	\$44	\$54	\$44	\$50	\$31	\$52	\$67
SBE	Proposals	27	42	17	22	58	217	15	21
	Awards	26	41	14	22	29	46	13	20
	Total \$ (In Millions)	\$1.2	\$1.4	\$0.6	\$0.8	\$1.2	\$4.5	\$1.0	\$1.2
	% of Obligations	0.7%	1.0%	0.4%	0.4%	0.6%	2.0%	0.4%	0.5%
	Average \$ (In Thousands)	\$46	\$34	\$43	\$36	\$41	\$98	\$77	\$59

Source: NSF Enterprise Information System 10/2/08

Note: OCI and OISE have obligations from split-funding awards that are managed by other directorates or offices.

Appendix 9

Merit Review Process Oversight Mechanisms

Performance evaluation of the operation of the merit review system is supported with information from the following activities:

- **Program Evaluation by Committees of Visitors.**
 To ensure the highest quality in processing and recommending proposals for awards, NSF convenes external groups of experts, called Committees of Visitors (COVs), to review each major 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 (comprised of scientists, engineers and educators from academia, industry, and government) 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, 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.¹¹
- **Advisory Committee (AC) Reporting on Directorate/Office Performance.**
 Advisory committees regularly provide community perspectives to the research and education directorates, Office of Cyberinfrastructure, Office of International Science and Engineering, and Office of Polar Programs. They are typically composed of 15-25 experts who have experience relevant to the programs under review and are broadly drawn from academia, industry, and government. Advisory Committees, as part of their mission, regularly review COV reports and staff responses.
- **Advisory Committee for GPRA Performance Assessment.**
 The Advisory Committee for GPRA Performance Assessment (AC/GPA) was established in June 2002 to provide advice and recommendations to the NSF Director regarding NSF's performance under the Government Performance and Results Act (GPRA). This is the only Foundation-wide external advisory committee that conducts an assessment of the entire portfolio of NSF investments in science, engineering, and education. The Committee, which is comprised of about 20 scientists, engineers, and educators, is drawn from academic, government research institutions, and private industry. Each year, the Committee reviews the Foundation's investments in *Discovery*, *Learning*, and *Research Infrastructure* to determine if NSF demonstrated significant achievement under these strategic goals. The AC/GPA annual report is publicly available on the NSF website.

¹¹ The COV reports and directorate responses are available electronically as a link from the NSF GPRA web page, <http://www.nsf.gov/about/performance/>.

Appendix 10

Requests for Formal Reconsideration of Declined Proposals

		Fiscal Year						
		2002	2003	2004	2005	2006	2007	2008
First Level Reviews (Assistant Directors):								
BIO	Request	4	4	3	2	4	2	5
	- Upheld	4	4	3	2	4	2	5
	- Reversed	0	0	0	0	0	0	0
CISE	Request	1	1	2	3	1	1	0
	- Upheld	1	0	2	3	1	1	0
	- Reversed	0	1	0	0	0	0	0
EHR	Request	2	3	2	7	4	6	7
	- Upheld	2	3	2	7	4	6	7
	- Reversed	0	0	0	0	0	0	0
ENG	Request	2	2	3	3	6	3	3
	- Upheld	2	2	3	3	6	3	3
	- Reversed	0	0	0	0	0	0	0
GEO	Request	1	4	4	0	0	2	0
	- Upheld	1	4	4	0	0	2	0
	- Reversed	0	0	0	0	0	0	0
MPS	Request	15	4	24	15	16	16	14
	- Upheld	15	4	24	15	15	15	14
	- Reversed	0	0	0	0	1	1	0
SBE	Request	1	3	3	3	4	0	2
	- Upheld	0	2	3	3	4	0	2
	- Reversed	1	1	0	0	0	0	0
Other*	Request	0	0	0	0	0	3	0
	- Upheld	0	0	0	0	0	3	0
	- Reversed	0	0	0	0	0	0	0
Second Level Reviews (Deputy Director):								
O/DD	Request	4	5	7	2	0	1	3
	- Upheld	4	4	7	2	0	1	3
	- Reversed	0	1	0	0	0	0	0
Total Reviews First & Second Level								
NSF	Request	30	26	48	35	35	34	34
	- Upheld	29	24	48	35	34	33	34
	- Reversed	1	2	0	0	1	1	0

Source: Office of the Director

Note: Other category includes OCI, OIA, OPP, and OISE. The number of decisions (upheld or reversed) may not equal the number of requests in each year due to the carryover of the pending reconsideration request.

Appendix 11

Average Number of Reviews per Proposal, By Method and Directorate or Office, FY 2008

		Methods of Review						
		All Methods	Mail + Panel	Mail-Only	Panel-Only	Not Externally Reviewed *	Returned without Review	Withdrawn Proposals
NSF	Reviews	248,772	100,144	15,665	132,963			
	Proposals	42,983	14,355	3,662	24,966	1,445	1,405	280
	Rev/Prop	5.8	7.0	4.3	5.3			
BIO	Reviews	39,308	33,684	160	5,464			
	Proposals	6,453	5,189	36	1,228	145	249	44
	Rev/Prop	6.1	6.5	4.4	4.4			
CSE	Reviews	27,874	2,905	276	24,693			
	Proposals	5,304	433	76	4,795	263	83	45
	Rev/Prop	5.3	6.7	3.6	5.1			
EHR	Reviews	23,552	995	225	22,332			
	Proposals	3,847	147	60	3,640	40	70	12
	Rev/Prop	6.1	6.8	3.8	6.1			
ENG	Reviews	45,879	2,631	543	42,705			
	Proposals	9,318	449	164	8,705	325	604	18
	Rev/Prop	4.9	5.9	3.3	4.9			
GEO	Reviews	25,490	21,896	2,688	906			
	Proposals	4,099	3,330	588	181	138	41	39
	Rev/Prop	6.2	6.6	4.6	5.0			
MPS	Reviews	48,503	13,652	9,845	25,006			
	Proposals	7,534	1,510	2,225	3,799	303	240	74
	Rev/Prop	6.4	9.0	4.4	6.6			
OCI	Reviews	2,381	356	15	2,010			
	Proposals	479	58	4	417	21	5	0
	Rev/Prop	5.0	6.1	3.8	4.8			
OISE	Reviews	3,134	72	1,010	2,052			
	Proposals	802	11	281	510	108	46	25
	Rev/Prop	3.9	6.5	3.6	4.0			
OPP	Reviews	4,277	3,144	293	840			
	Proposals	827	586	71	170	37	4	3
	Rev/Prop	5.2	5.4	4.1	4.9			
SBE	Reviews	25,551	18,093	573	6,885			
	Proposals	4,299	2,637	147	1,515	65	32	18
	Rev/Prop	5.9	6.9	3.9	4.5			
Other	Reviews	2,823	2,716	37	70			
	Proposals	21	5	10	6	0	31	2
	Rev/Prop	134.4	543.2	3.7	N/A			

Source: NSF Enterprise Information System 10/2/08

* Note: The proposal totals shown in the "All Methods" category do not include the proposals shown in the "Not Reviewed" category. Proposals which are not reviewed include SGERs and grants for travel and symposia. The "Not Reviewed" category includes award and decline actions which were not reviewed, while the "Returned without Review" and "Withdrawn Proposal" categories reflect proposals which were neither awarded nor declined. There were 41,540 panel summaries in FY 2008. Reviewers participating as both a mail and a panel reviewer for the same proposal are counted as one review in this table. Withdrawn proposals include only those that underwent merit review.

Appendix 12

Methods of NSF Proposal Review

FY	Total	Mail + Panel		Mail Only		Panel Only		Not Externally Reviewed	
	Proposals	Proposals	Percent	Proposals	Percent	Proposals	Percent	Proposals	Percent
2008	44,428	14,355	32%	3,662	8%	24,966	56%	1,445	3%
2007	44,577	14,292	32%	3,737	8%	25,135	56%	1,413	3%
2006	42,352	14,349	34%	3,895	9%	22,384	53%	1,724	4%
2005	41,722	13,919	33%	3,656	9%	22,735	54%	1,412	3%
2004	43,851	13,345	30%	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%

Source: NSF Enterprise Information System 10/2/08

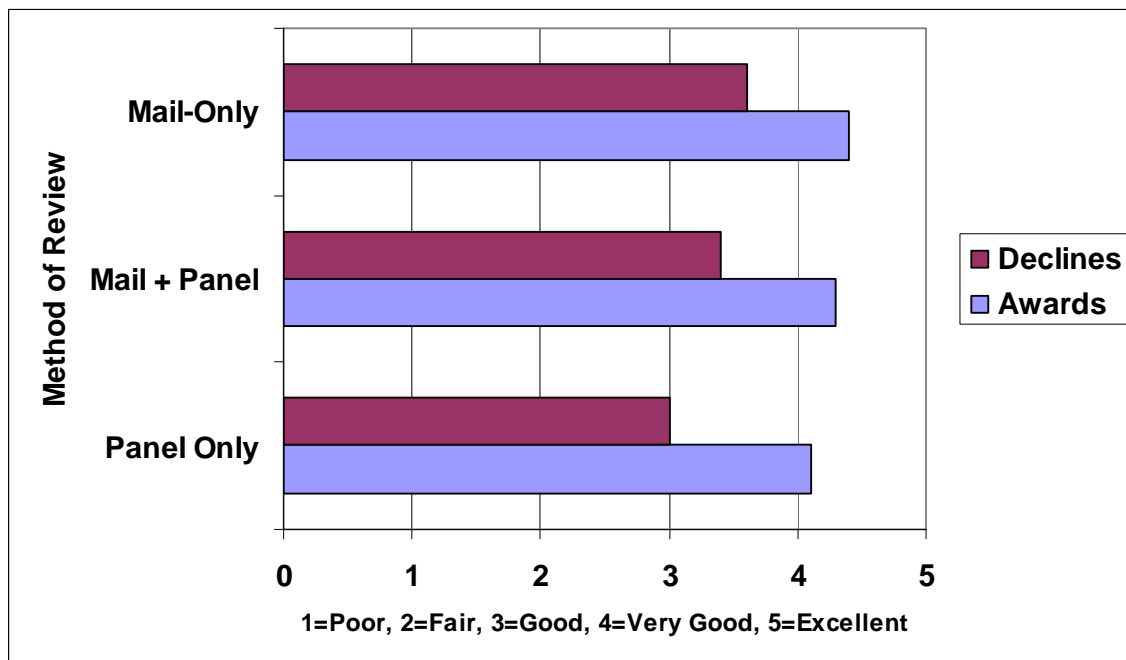
Note: Panel-Only includes cases where panel was mailed proposal for review prior to panel.

Appendix 12.1

Methods of NSF Proposal Review by Directorate or Office FY 2008

Directorate	Total	Mail + Panel		Mail-Only		Panel-Only		Not Reviewed	
	Proposals	Proposals	Percent	Proposals	Percent	Proposals	Percent	Proposals	Percent
NSF	44,428	14,355	32%	3,662	8%	24,966	56%	1,445	3%
BIO	6,598	5,189	79%	36	1%	1,228	19%	145	2%
CSE	5,567	433	8%	76	1%	4,795	86%	263	5%
EHR	3,887	147	4%	60	2%	3,640	94%	40	1%
ENG	9,643	449	5%	164	2%	8,705	90%	325	3%
GEO	4,237	3,330	79%	588	14%	181	4%	138	3%
MPS	7,837	1,510	19%	2,225	28%	3,799	48%	303	4%
OCI	500	58	12%	4	1%	417	83%	21	4%
OISE	910	11	1%	281	31%	510	56%	108	12%
OPP	864	586	68%	71	8%	170	20%	37	4%
SBE	4,364	2,637	60%	147	3%	1,515	35%	65	1%
Other	21	5	24%	10	48%	6	29%	0	0%

Source: NSF Enterprise Information System 10/2/08

Appendix 13**Average Reviewer Ratings by Method of Review FY 2008**

Source: NSF Enterprise Information System 10/2/08

Appendix 14

Accomplishment Based Renewals and Creativity Extensions

Accomplishment-Based Renewals

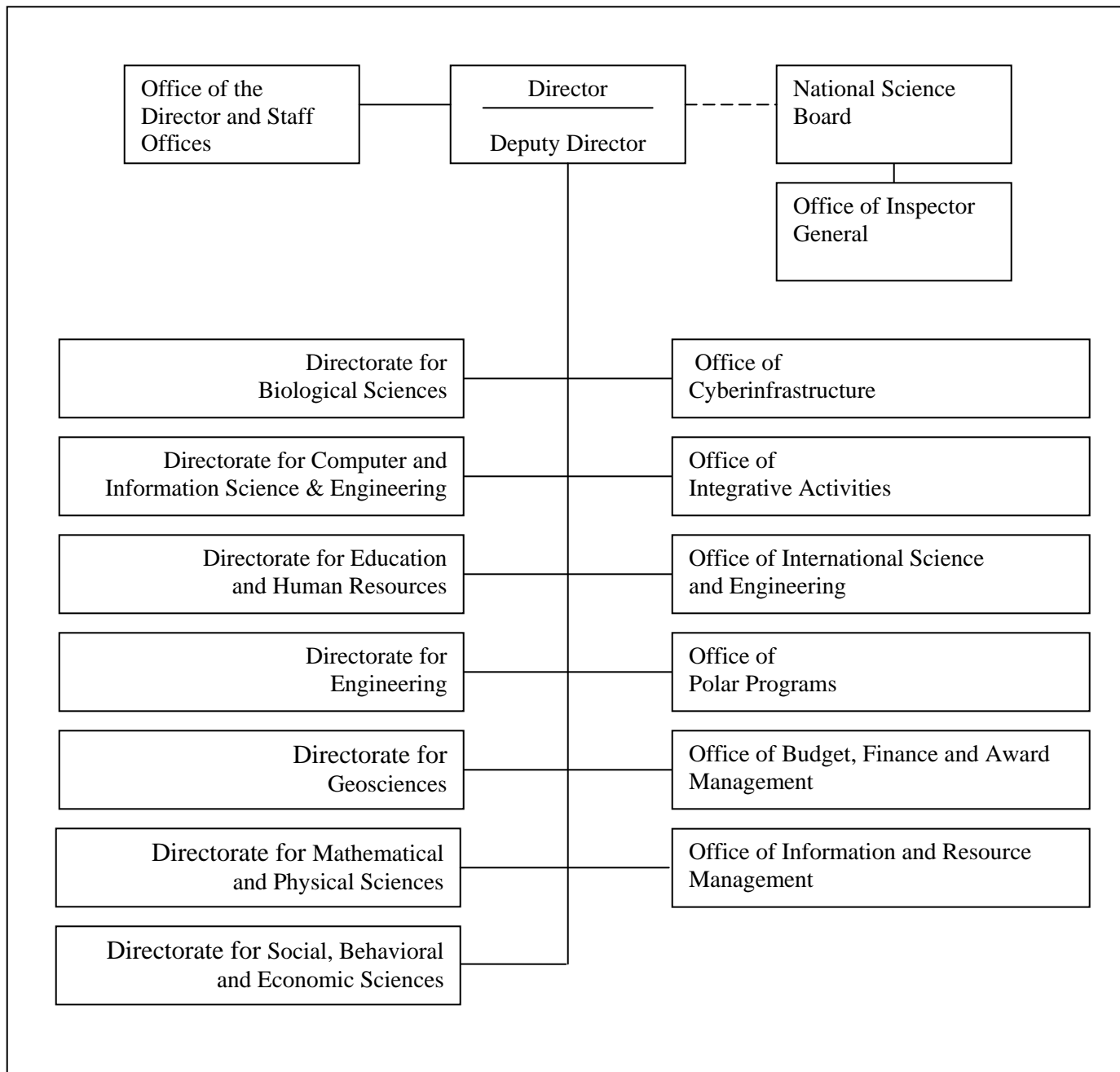
In an accomplishment-based renewal, the project description is replaced by copies of no more than six reprints of publications resulting from the research supported by NSF (or research supported by other sources that is closely related to the NSF-supported research) during the preceding three-to-five 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 2008, there were 80 requests for accomplishment-based renewals; 28 of which were awarded.

Creativity Extensions

A program officer may recommend the extension of funding for certain research grants beyond the initial period for which the grant was awarded for a period of up to two years. The objective is to offer the most creative investigators an extension to address opportunities in the same general research area, but not necessarily within the scope covered by the original/current proposal. Awards eligible for such an extension are generally three-year continuing grants. Special Creativity Extensions are usually initiated by the NSF program officer based on progress during the first two years of a three-year grant. In FY 2008, there were 24 Special Creativity Extensions granted.

Appendix 15

National Science Foundation Organization Chart



Appendix 16

Terms & Acronyms

<u>Acronym</u>	<u>Definition</u>
AC	Advisory Committee
AC/GPA	Advisory Committee for GPRA Performance Assessment
AD	NSF Assistant Director
BFA	Office of Budget, Finance and Award Management
BIO	Directorate for Biological Sciences
BIIS	NSF Budget Internet Information System
CAREER	Faculty Early Career Development Program
CGI	Continuing Grant Increments
CISE	Directorate for Computer and Information Science and Engineering
COV	Committee of Visitors
EAGER	Early-concept Grants for Exploratory Research
EHR	Directorate for Education and Human Resources
EIS	Enterprise Information System
ENG	Directorate for Engineering
EPSCoR	Experimental Program to Stimulate Competitive Research
FTE	Full-Time Equivalent
FY	Fiscal Year
GEO	Directorate for Geosciences
GPRA	Government Performance and Results Act
IPAs	Temporary employees hired through Intergovernmental Personnel Act
IPAMM	Impact of Proposal & Award Management Mechanisms
IPS	Interactive Panel System
MPS	Directorate for Mathematical and Physical Sciences
NSB	National Science Board
NSF	National Science Foundation
OCI	Office of Cyberinfrastructure
OD	Office of the Director
ODS	Online Document System
OIA	Office of Integrative Activities
OIG	Office of Inspector General
OISE	Office of International Science & Engineering
OMB	Office of Management and Budget
OPP	Office of Polar Programs
PARS	Proposal, PI and Reviewer System
PART	Program Assessment Rating Tool
PI	Principal Investigator
RAPID	Grants for Rapid Response Research
R&RA	Research and Related Activities
SBE	Directorate for Social, Behavioral and Economic Sciences
SGER	Small Grants for Exploratory Research
VSEE	Visiting Scientists, Engineers and Educators