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The National Sea Grant College Program

A White Paper Prepared by the

Board on Oceans and Atmosphere

Commission on Food, Environment, and Renewable Resources
National Association of State Universities and Land-Grant Colleges

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Findings

1. The National Sea Grant College Program (NSGCP), since its creation in 1966, has made significant contributions to the nation's marine R&D effort in the areas of estuarine and coastal ocean studies, seafood production and safety, coastal engineering, environmental protection and remediation, marine biotechnology, the wise management of marine resources, and marine policy. The NSGCP has also responded to national initiatives in extension and public education through its marine advisory service network. Many of its results and products have had regional and national impacts.
2. The level of support for the NSGCP by the Department of Commerce has not reflected the high national priority otherwise assigned to R&D activities, economic development and education by both the Administration and the Congress. The Department's inefficient and inconsistent administrative procedures have impeded rather than facilitated the Program's operation. The Department has failed to participate effectively in interagency programs of high national priority, such as the biotechnology initiative. Furthermore, by failing to maintain effective and consistent quality control over the Program, the Department has prevented the NSGCP from making its full potential contribution to the nation.
3. Continuation of the *status quo* will deprive the nation of a proven R&D, extension, and educational capability, and will further erode the morale of Sea Grant staffs and the willingness of the best marine scientists and engineers to work for the NSGCP. Valuable congressional and Program time and energy will continue to be consumed in carrying out the planning and budget-development activities that have not been handled effectively by the Department of Commerce.
4. Recognition by the Department of Commerce that the NSGCP is a valuable resource that can play an important role in meeting the Department's mission, together with administrative adjustments within NOAA, are necessary if the NSGCP is to remain a viable contributor to the nation's economic and environmental well-being.

I. History

The National Sea Grant College Program (NSGCP) was transformed from an idea to an actuality in a remarkably short period of time during the mid-1960s. The concept of "Sea Grant Colleges" was advanced by Athelstan Spilhaus in a speech to the American Fisheries Society in 1963. Within a year, substantial interest had been generated in industry, government and university circles. In the fall of 1965 a major national conference gave full body to the concept and demonstrated an impressive range of support. Along the way, what had begun as an exclusively marine and fisheries concept was broadened to include the Great Lakes as well as the ocean and to address the full gamut of coastal and ocean issues from aquaculture and fisheries to marine engineering and ocean policy. Furthermore, all members of the projected partnership endorsed a program concept that included research, education and training, extension, and a strong outreach component. From the earliest days, the term "College" was meant to suggest an enduring activity. There was widespread agreement, however, that a Sea Grant "College" would be a networked program, rather than bricks and mortar housing a new and self-contained organization.

By late 1965, proposed legislation was under review. From the beginning, Congressional interest in the program included two important components: support was totally bipartisan, and both the House and the Senate worked aggressively to launch it. The House Merchant Marine and Fisheries Committee was able to pass a NSGCP bill as an amendment to newly passed legislation on Marine Resources and Engineering and Development. In the Senate, passage was guided by a special subcommittee of the Labor and Public Welfare Committee, with the early strong support of the chairman of the Commerce Committee.

In just over a year the NSGCP legislation moved from introduction to signature (on October 17, 1966) by President Johnson to become Public Law 89-688. The legislation recognized the importance of marine resources and the critical need for research, training and extension in promoting the wise use and conservation of those resources. It declared that the federal government should play a major role in providing for the establishment, development, and operation of a program of Sea Grant Colleges.

The responsibility for establishing and administering the program was given to the National Science Foundation (NSF), which set up a National Sea Grant Office in 1967. A distinguished National Sea Grant Panel, composed of industry, governmental and academic members, helped to guide the development of the program. By 1968 the first grants to nascent Sea Grant programs had been awarded, and the development of a nationwide network of such programs was underway. By the time the program was moved from NSF two years later, more than half the future Sea Grant Colleges were well established.

The essential and distinctive features of the Sea Grant concept were hammered out while the program was housed at NSF. These features, which continue today, include the key elements of :

- an emphasis on the development of broad-based programs, not just on projects;
- a grassroots approach to project identification and the initial definition of priorities;
- a high degree of responsibility, authority and accountability at the university program level;

- the inclusion of a broad range of scientific, engineering and policy disciplines, ranging well beyond the interests of conventional oceanography;
- a concern with both scientific quality and societal needs in assessing research activities;
- an explicit recognition of the importance of extension and public education activities;
- an emphasis on partnership interactions between the federal government, various elements of the marine community, and the universities; and,
- incorporation of a matching-fund requirement in the enabling legislation.

Even though many of these elements were quite at variance with the NSF's normal way of doing business at that time, Foundation officials took great pains to design this new institution so that it would reflect the intent of its creators. The fact that the framework has survived for more than a quarter of a century suggests that NSF did its work well.

The NSGCP was moved out of NSF and into the new National Oceanic and Atmospheric Administration (NOAA) as part of President Nixon's Reorganization Plan No. 4 in 1970. The program was the only university-based activity assigned to the new agency. It has been the largest extramural science program in NOAA (and in the Department of Commerce) ever since. While this uniqueness created some friction -- both with NOAA's in-house laboratories and with its regulatory units -- the new agency incorporated both the former NSF staff and the key elements that NSF had incorporated into NSGCP and proceeded to implement the program along the lines that had already been established. In 1971, four universities were designated as the first "Sea Grant Colleges." This designation recognized that the Sea Grant programs at those universities had achieved a mature capacity to plan and manage broad-based research, educational and extension activities. It also acknowledged the commitment of the universities -- through matching funds and through institutional arrangements that encouraged cross-unit, multidisciplinary activity -- to the Sea Grant concept. Implicit in the designation was both a sense of partnership between the federal government and the universities, and a long term federal commitment to support the Sea Grant Colleges. Additional Sea Grant Colleges have been designated as their programs matured (Table 1). The total number in 1992 is 26. Figures 1 and 2 show the distributions of FY 1991 federal and matching support levels across the College programs.

The NSGCP did not grow as fast as many of its founders had expected and hoped. This can be attributed to several factors:

- (1) Administrations of the 1970s were not as interested in ocean programs as those of the 1960s.
- (2) NOAA itself emphasized other priorities during its formative years.
- (3) The very breadth of the program gave it wide entree in Washington D. C., but left it without a single strong interest group particularly dedicated to its health and well-being.
- (4) Effective applied research and extension programs oriented toward societal needs proved more difficult to design and implement than the program's founders had expected. NSF's subsequent experience with the IRRPOS (Interdisciplinary Research Related to Problems of Society) and RANN (Research Applied to National Needs)

programs have shown that the NSGCP is not unique in finding this problem challenging.

Finally, Administrations tended to view the NSGCP as a Congressional program and left to Congress the responsibility for nurturing the program. Congress responded by increasing appropriations annually, even in the absence of administration requests. Growth during the 1970s was steady enough to allow new programs to develop and mature without cannibalizing activities already underway. The program was regularly reauthorized. The \$41.8 million appropriation for fiscal year 1981 was relatively small for a program with a national mandate, particularly in view of additional responsibilities that were added in the 1976 authorization. Nevertheless, to all appearances the NSGCP was healthy and productive.

In early 1981, the new Administration ordered a review of the entire federal budget with the intent of making deep cuts. The Heritage Foundation[‡], the source of many of the Administration's budget initiatives, had urged a significant increase in the NSGCP. It came as a surprise, then, when the program was identified for scaling back, a result, perhaps, of the NSGCP's small size and low visibility within NOAA relative to the scale of the national changes underway at the time. The proposed reduction was consistent with targeted cuts in all of NOAA's extramural programs, however.

As the result of a second round of review, the Department of Commerce (DOC) decided to opt for complete elimination, rather than scaling back in the NSGCP. Acting on a bipartisan basis, as it had before, Congress resisted strongly and kept the program alive. Even though every Administration's DOC budget request for eight years "zeroed out" the NSGCP, the program's outside supporters and Congress insured that appropriations continued and that the program was reauthorized (twice) during the 1980s. The combination of cutbacks during the early 1980s and a steady loss of purchasing power to inflation during the remainder of the decade ate steadily into the NSGCP's capabilities, however. Also, emerging new programs could be funded only at the expense of existing programs.

The NSGCP reappeared in the Administration's DOC budget request for Fiscal Year 1991. The extension and other non-research elements continued to be targeted for elimination, but there was once again a realization that the program's unique capabilities and niche in the federal marine science structure were needed to address important national needs.

II. Accomplishments

The NSGCP is the national network of universities meeting the changing environmental and economic needs of the people in our coastal, oceanic and Great Lakes regions. It is a primary national research and education resource in the areas of water quality, estuarine processes, aquaculture, biotechnology, seafood processing, the development of marine products, fisheries recruitment and productivity, ocean and coastal engineering and technology, and marine policy. The key ingredients of the Sea Grant approach, which make it unique, include its grassroots nature; its blend of scientific orientation and peer review with a problem orientation; its emphasis on a combined approach involving research, education, extension and public service; its sustained programmatic efforts; and its partnership approach, involving not only matching-fund linkages but also a policy of networking across traditional boundaries (*adapted from a May, 1992 report to OMB from J. Cato, on behalf of the NSGCP directors*).

The use of research, education, extension and public service to address societal needs requires a strategic approach and tailored tools and techniques designed to solve specific

[‡] Heatherly, Charles L., Editor. *Mandate for Leadership*. Heritage Foundation, Washington, D.C. 1981.

problems. One problem may require a substantial research effort. Another may need the transfer of existing information. A third may depend on an educational effort to develop a new source of human capital. Others may require networking with agencies, industries or communities to bring people together in a common activity. Some problems will require all of these elements.

No brief report can do justice to the results of a quarter-century of research, education, and extension that have emanated from the efforts of thousands of researchers and extension specialists working on thousands of projects. However, APPENDIX I provides a sampling of the diversity of NSGCP contributions.

III. Department of Commerce Support

In 1970, when NOAA was created and incorporated into the Department of Commerce, the transfer of the NSGCP to the new agency was seen to fill an important niche by providing a bridge between the world's premier research community in U.S. universities, and the cabinet department with responsibility for the nation's economic welfare. Events during the intervening years have only emphasized the importance of such bridges.

Yet the Department of Commerce has not exploited the potential role that the NSGCP can play in helping it to meet its mission. The evidence of DOC's failure to recognize the NSGCP's potential is evident in:

1. Budget Requests and Appropriations

For more than a decade, president after president has promoted R & D as an important federal contribution to the nation's future well-being. Congress has endorsed this view. The budget requests and appropriations for the marine science components of the National Science Foundation (Fig. 3) and the Office of Naval Research (Fig. 4), for example, show a consistent pattern of increasing investment in R & D. Yet during this same period:

- Administration requests in support of the NSGCP (Fig. 5a) have been inconsistent and have failed to match either inflation or the profiles of other R & D agencies.
- Congressional recognition of the Program's valid role in the nation's R & D effort have resulted in a profile of appropriations that is less erratic than the Department of Commerce's requests (Fig. 5b), but this recognition and support have overcome neither the discrepancy relative to other federal R & D activities nor the erosion of the NSGCP's budget by inflation (Fig. 6). Such support is difficult to sustain at a time of reduced budget flexibility and in the face of the Administration's persistent failure to support the Program at a productive level.
- The NSGCP has suffered relative to comparable federal programs. The ratio of NSGCP appropriations to those of ONR and NSF (Figure 7) show that the Sea Grant decline is not simply a reduction in the national priority of mission-oriented or pure basic research.
- Support per program has dropped precipitously. In 1971, the NSGCP budget supported 4 Sea Grant Colleges and 13 institutional programs (Figure 8) whereas by

1992, 26 Sea Grant Colleges and 3 institutional programs were being supported. In 1971 dollars, the average support level per institution has dropped from \$782,000 to \$406,000 (Figure 9).

The impact of this decline is striking. Data for one of the larger programs are shown in Figure 10. Even though the support per project peaked in 1987, the number of projects that this program can fund has continued a decline that began in 1981.

It is clear that, as a result of DOC's failure to take advantage of the NSGCP's "bridge," R & D, and extension capabilities, there has been an actual decline in resources appropriated for these areas over the past decade and a half.

2. Administrative Procedures

Effective R & D programs place enormous demands on the time and creativity of their participants. The importance of continuity of support and the minimization of administrative overhead in maintaining productive programs have long been recognized by experienced R & D agencies, such as NSF and ONR.

As a result, these agencies have developed streamlined procedures for processing grants and contracts. Despite the daunting list of federal laws and regulations that are applicable to university scientific research (Appendix II), NSF and ONR impose only the requirements specified by law or required to ensure accountability. NSF has also developed OPAS (Organizational Prior Approval System) procedures to minimize damage to research teams and losses in productivity due to inadvertent or unavoidable delays in processing grant awards. The administrative processing times (after scientific review and processing) achieved by ONR and NSF are summarized in Figures 11a and b.

The performance of the administrative apparatus responsible for the NSGCP is strikingly different. Not only do approved grants to Sea Grant programs take substantially longer to process (Figure 11c), but the administrative requirements are much more cumbersome and onerous, without any apparent compensatory gains in accountability or program effectiveness.

The administrative burden borne by DOC's grantees is exacerbated by continually changing paperwork requirements. Since the mid-1980s, the approval and reporting requirements have changed numerous times, representing a substantial tax, in terms of time and effort, on the grantees.

Individual institutions report numerous examples of the difficulty of working with NOAA's and DOC's grants' management personnel. The problems range from trying to explain and justify complex scientific and engineering processes and equipment to personnel with no technical expertise, to an apparent DOC inability to recognize the difference between a grant and a contract, to extended delays in the awarding of 6-figure grants because someone (unidentified) somewhere in a university of thousands of people owes some branch of DOC perhaps a few hundred dollars (the costs to NOAA and to institutional Sea Grant programs to try to resolve such cases can run to many times the sum owed), to an apparent impression that continuing research programs can be stopped for a few months and then restarted again without serious damage to the quality of the scientific results and to the viability of the research teams.

3. Participation in National Initiatives

The President's 1992 budget message unveiled a major, multi-agency initiative in biotechnology. This initiative, coordinated through the Federal Coordinating Council for Science, Engineering and Technology (FCCSET) under the leadership of the President's Science Advisor, recognizes the importance and potential application to the health sciences, to agriculture, and to the environmental sciences of new discoveries in the field of biotechnology.

Yet despite the Sea Grant network's initiative, in 1983, in proposing a national biotechnology program, despite its experience and interest in this area, despite its investments from its declining resource base in biotechnology, despite the announced Japanese investment of more than \$200 million over the next decade in new marine biotechnology centers, and despite every indication that biotechnology will play an important role in marine bioremediation, in monitoring and maintaining marine oceanic biodiversity, in enhancing the consumer appeal and productivity of domesticated seafood species, and in assuring the quality and safety of seafood products, the NSGCP was not afforded an opportunity to play an important or even enhanced role in the new FCCSET initiative. Table 2 shows that whereas agencies such as DOD, EPA, NASA and NSF proposed significant percentage increases in their biotechnology programs, the DOC requested a zero percent increase for FY 93 -- not even enough to offset inflation, let alone to take advantage of the new technology. As a result, the NSGCP will be ill-equipped to make its potential contribution to national economic and environmental goals in this area.

4. Quality Control and Program Enhancement

Throughout this review, criticisms of segments of the NSGCP have surfaced. Such criticisms have been both topical and geographic. Some, apparently, are of long standing.

It was beyond the mandate of this White Paper to explore these criticisms in depth. Thus, no attempt has been made to identify weaknesses in specific programs, or to separate perceptions from reality.

It is noteworthy, however, that there has been no consistent effort by the DOC to address process-oriented issues of program quality on a systemic basis. The importance to a "bridge" program, such as the NSGCP, of a broad geographic base requires that weaker grantees receive special attention and counsel from the Program's management. NSF's (for example) more brutal "sink or swim" style of management, where the only objective is top-quality published basic research, is inappropriate for the NSGCP. Progressive, achievable goals should be set to ensure that all Sea Grant programs attain and maintain the cutting-edge capability that is needed to carry out the NSGCP's mandate. The absence of the kind of programmatic oversight and assistance required to maintain all components of the NSGCP at a uniform and high standard of performance is a striking feature of the DOC's stewardship of the program. It is regrettable that the DOC, which originated the Baldrige awards and which is an enthusiastic supporter of US TQM efforts, has not been more aggressive in implementing this technique in its own domain.

IV. Consequences to the NSGCP of Continuation of the *Status Quo*

On the positive side, continuation of the *status quo* will continue to provide the DOC and NOAA with access to that portion of the academic community with particular expertise in estuarine and nearshore marine science and engineering. The NOAA Administrator during the Bush Administration, one of the founders of the Sea Grant program, expressed a desire to see links between his organization and academia strengthened. The NSGCP is one of several mechanisms that might be used in pursuit of such a goal.

It appears, however, that the *status quo* implies more negatives than positives. For example:

1. The linkage between Sea Grant's strengths and DOC's mission goals are not obvious or robust enough to ensure that NSGCP priorities will be evaluated knowledgeably or forwarded to Congress.

2. DOC's administrative apparatus will continue to impede, rather than facilitate, Sea Grant's activities. There is no evidence to suggest that the arbitrary and capricious character of DOC's administrative rules can be reversed. Thus, grantee morale will continue to erode, and the effectiveness of the NSGCP's activities will continue to be interrupted by glitches in the grant-award process and by the promulgation of ever more regulations.

3. DOC's failure to promote the NSGCP aggressively within the executive branch will continue to defer the oversight and planning functions for the NSGCP to congressional committees. These functions consume inordinate amounts of the time of staff and members of Congress, as well as the energy of many of the Sea Grant directors.

Because of the DOC's failure to recognize the NSGCP's potential contribution to its mission, the administration's budget continues to reflect weak support for the NSGCP. With the ongoing deficit crisis, Congress has very little freedom of action. Thus, if DOC fails to come to the aid of the NSGCP, it will be lucky to do any better than level funding for the rest of the decade.

Level funding means that inflation and the increased costs that result from the application of ever-more-sophisticated scientific tools must be paid from the core budget. This will continue the inexorable shrinkage of the Program, with further erosion of the number of supported projects, of the morale of participating scientists, and of the NSGCP's capability to address the growing number of scientific, environmental, and social problems that afflict the land-ocean interface.

V. Remedial Action

In order for the NSGCP to achieve its research and development (R&D), extension, and public service potential within NOAA and the Department of Commerce, the following changes are required:

1. Recognition by the Department of Commerce of NSGCP's accomplishments and potential to contribute to the Department's mission. The Program's economic contributions and unique extension and public outreach capabilities are particularly germane to this mission. The Department should begin by restoring the NSGCP's budget to its 1981 purchasing power. The restored FY92 figure would have been \$65 million (a conservative estimate based on the CPI inflation rate; the inflation rate for scientific activities has actually been greater).

One of the striking features of the NSGCP's history is the failure of the Department of Commerce to take advantage of and enhance the Program's contributions to economic development and extension. At a time when the Department is enhancing NIST's outreach capability, the failure to build on or even maintain Sea Grant's extension program is wasteful of scarce resources and is difficult to understand.

2. Exploitation of the NSGCP's links to academia to develop cutting-edge national initiatives in areas such as marine biotechnology, coastal ocean environmental and policy studies, and aquaculture, which relate directly to the nation's future economic and environmental health. The expertise in modern biotechnology, environmental science and policy, and the life history and health of economically important aquatic organisms at the universities affiliated with the NSGCP is a largely untapped resource. At a time of unparalleled interest in harnessing the nation's research capability in support of economic revitalization, the NSGCP has the organizational capability, geographic base, and expertise to play a leadership role, in these areas.

3. Coordination of the NSGCP with other components of the nation's academically-based marine R&D effort, particularly during the development of multi-agency budget initiatives. Drawing on the Federal Coordinating Council for Science, Engineering, and Technology (FCCSET), the White House has launched a series of multi-agency initiatives during the past three years. By failing to see that the NSGCP is fully integrated into these initiatives, the Department of Commerce has sacrificed the multiplier effect that its programs could derive from the synergy generated by such interagency cooperation.

4. Enhancement of the partnership between the NSGCP office in NOAA and individual Sea Grant programs, with particular emphasis on:

- a. Outreach activities to strengthen weaker programs. Because of the importance of maintaining access to as large a fraction of the coastal R&D and customer communities as possible (so as to maximize environmentally sound economic development around the nation), the Department of Commerce and NOAA must be pro-active in providing advice and setting realistic goals for improvement to ensure that the less successful Sea Grant programs achieve the high standards of quality in research and extension that prevail throughout the bulk of the network.
- b. Partitioning the duties and responsibilities of program managers and individual program directors so that NOAA's National Office focuses on oversight, process and coordination, while individual programs focus on implementation and management. This would cut administrative overhead, which is high relative to comparable federal programs, by avoiding duplication of effort and by establishing distinct and complementary roles for headquarters and individual program personnel. At present, there is substantial overlap between the activities of headquarters' program managers and individual program directors and their staffs, particularly in the areas of project review and selection. Greater efficiency without any loss of accountability could be achieved if program managers focussed on oversight of the review process and cross-program integration and liaison with other federal agencies, while directors focussed on the solicitation, review, selection, and management of those individual projects which are heavily influenced by problems and issues specific to different regions of the country.
- c. Strengthening the professional development of program managers and directors. Both national office program managers and individual program directors tend to be drawn from the scientific and academic communities. In light of the NSGCP's responsibilities for effectively managing a complex assemblage of directed research, extension, and coordination (state-federal, regional, and research-extension agent-customer) activities,

the Program needs to develop a systematic educational program to ensure that its leadership understands the Program's shared objectives and responsibilities, and that it takes full advantage of modern management techniques. A systematic rotation of personnel from individual Sea Grant programs through the D.C. office for one- to two-year periods could form an important component of such an educational program, as well as enhance the sense of partnership throughout the program, and bring a steady stream of "new blood" to headquarters.

- d. Reviewing and upgrading the grant administration process. As discussed earlier, the administration of awards to individual Sea Grant Programs is excessively cumbersome and inefficient. Figure 11 illustrated one consequence of the present system. Part of the problem is attitudinal -- all too often the relationship between the agency and individual programs appears to be adversarial rather than collaborative. The granting agency has not drawn on the experience and expertise of other federal programs which make grants to universities and which have developed methods to expedite the awarding and administration of such grants without short-changing their statutory obligations or compromising their accountability for the wise use of federal funds.
 - e. Developing and enforcing clear conflict-of-interest standards. Because of the limited size of many Sea Grant programs and because program leaders, in many cases, are active researchers, the potential for real and perceived conflicts of interest in reviewing and selecting projects to be funded at the local level cannot be ignored. Responsibility for providing leadership in addressing this potential without unfairly penalizing well-qualified researchers lies with the NSGCP's national office.
5. Reassignment of responsibility for the NSGCP within NOAA so as to:
- a. Avoid the appearance of conflict of interest in decisions involving NOAA's internal programs and the NSGCP. Many federal agencies which manage and fund intramural and extramural programs with closely related or overlapping mandates (NIH for example) have found it advantageous to organizationally distance the office that makes funding decisions from the in-house recipient groups. When combined with a broadly based advisory and review apparatus, such an arrangement can dispel concerns about fairness and appearance of conflict of interest. In the case of NOAA, it may be wise to develop a single process to cover all its programs with substantial extramural components (Coastal Ocean, Global Change, and NSGC Programs, for example).
 - b. Elevate the visibility of the NSGCP within NOAA so that its unique capabilities can be used more effectively by all the NOAA line offices. At the present time, the NSGCP is embedded so deeply in the NOAA structure that its ability to achieve the recognition required to attain its full potential is very limited. No senior executive in the agency can give the Program sufficient attention to address all the issues raised in this White Paper. If the NSGCP (and, perhaps, NOAA's other substantial extramural programs as well) were elevated to the Assistant Administrator level, for example, its ability to play an appropriate leadership role within NOAA and the Department of Commerce would be greatly enhanced.

The actions recommended are substantial. They need not be costly, however. If management responsibilities were more effectively partitioned between program managers and program directors, and if the cumbersome and expensive grant administration process were streamlined, there is no reason to believe that the personnel resources freed up could not fully implement all the remedial actions outlined in this section.

Table 1

Chronology of the designation of Sea Grant Colleges.

1971	Oregon State University University of Rhode Island Texas A&M University University of Washington
1972	University of Hawaii University of Wisconsin
1973	University of California
1975	State University of New York and Cornell University
1976	University of Delaware State University System of Florida Massachusetts Institute of Technology University of North Carolina
1978	Louisiana State University
1980	University of Alaska University of Georgia University of Maine / University of New Hampshire
1982	University of Maryland University of Michigan / Michigan State University Mississippi / Alabama Sea Grant Consortium
1984	Virginia Graduate Marine Science Consortium University of Minnesota
1986	South Carolina Sea Grant Consortium
1988	University of Connecticut Ohio State University
1989	New Jersey Marine Science Consortium University of Puerto Rico

Table 2

Federal Investment (\$ million) in biotechnology research
(from Feb. 1992 FCCSET Report on *Biotechnology for the 21st Century*)

Agency	FY 1991 Actual	FY 1992 Request	FY 1993 Request	1992-93 Change (%)
DOC	12.7	13.0	13.0	0
DOD	79.6	81.0	86.6	7
EPA	14.3	15.9	18.3	15
NASA	26.5	36.6	44.7	22
NSF	162.0	174.0	206.0	18

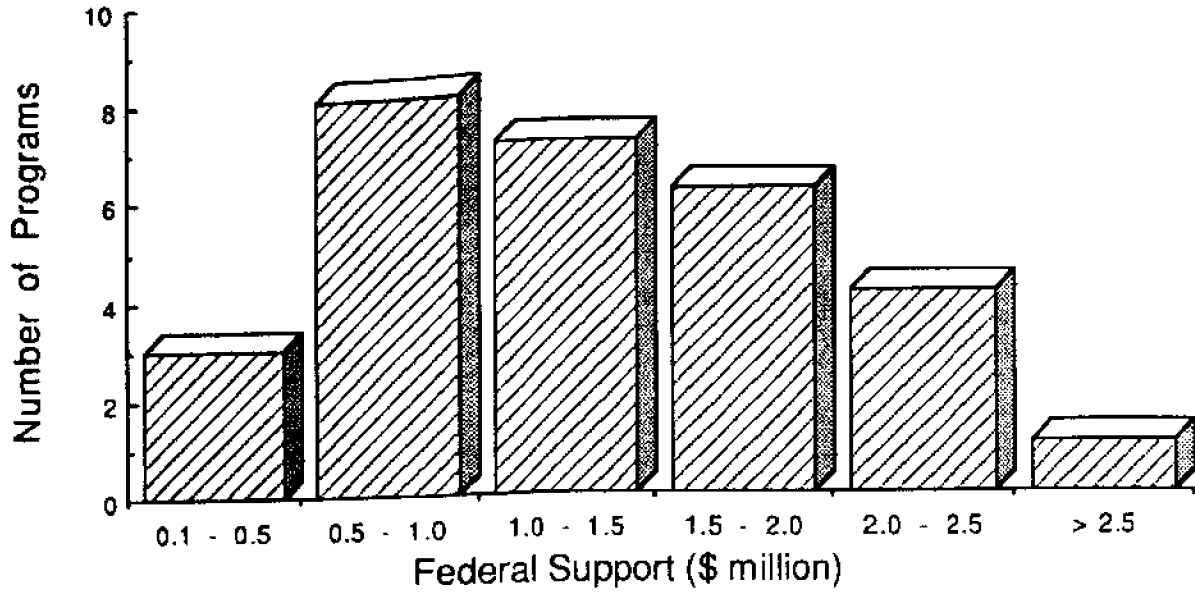


Figure 1. Size of FY1991 federal grants to Sea Grant institutions.

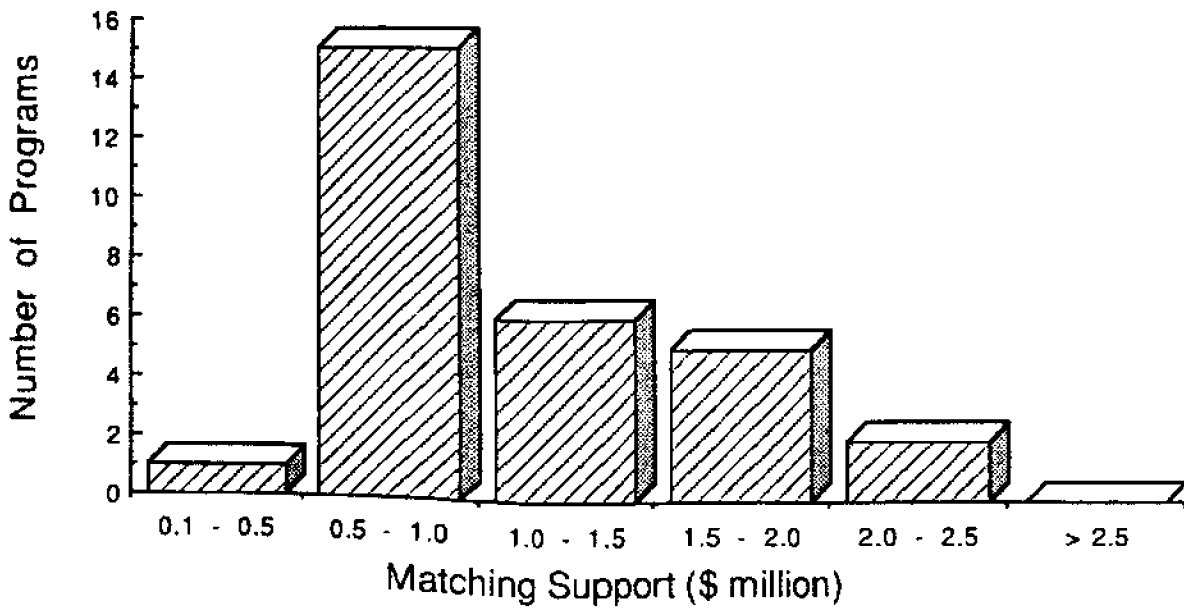


Figure 2. FY1991 state matching support for Sea Grant institutions.

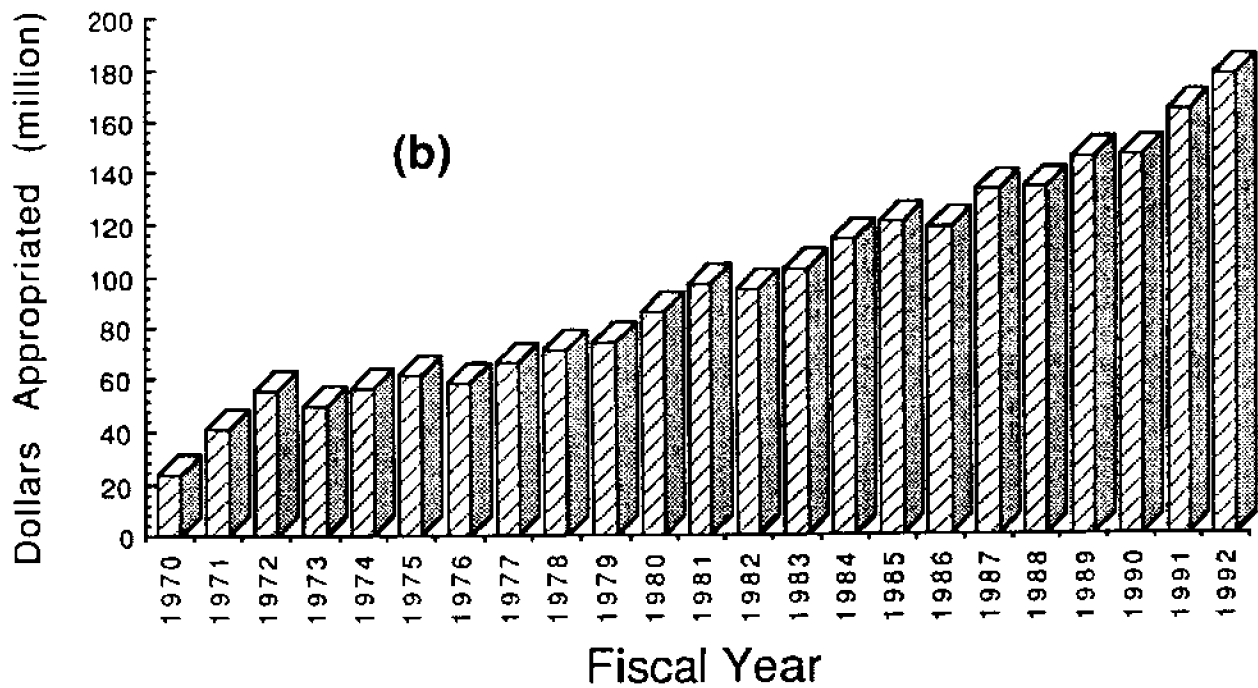
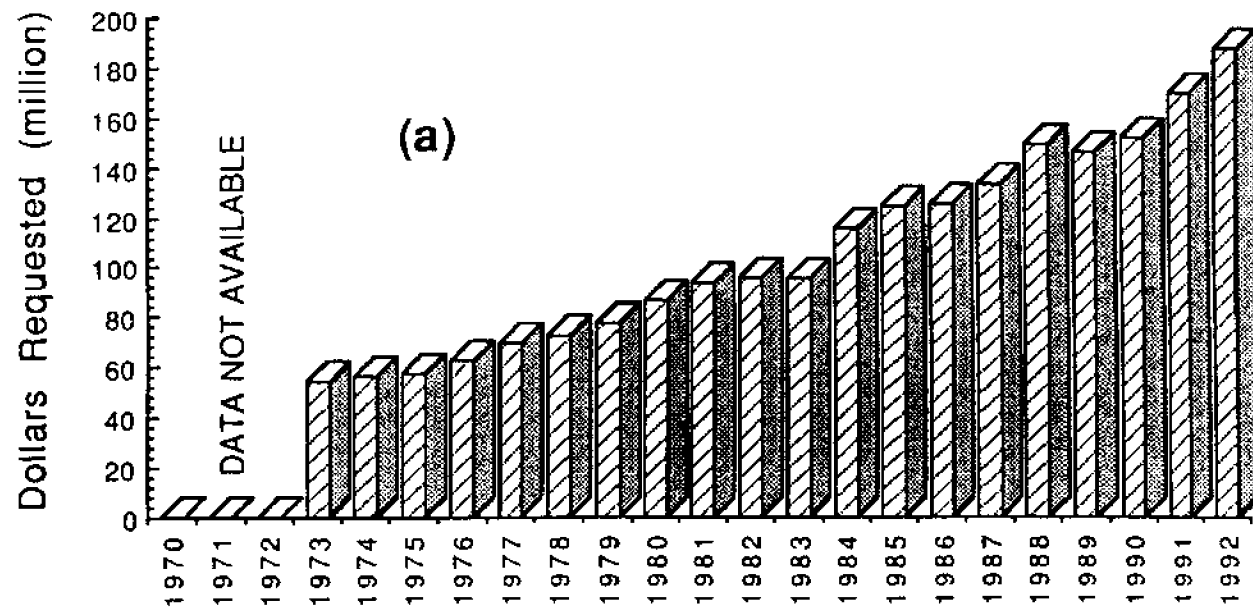


Figure 3. National Science Foundation funding for ocean sciences
 (a) President's budget,
 (b) Congressional appropriations.

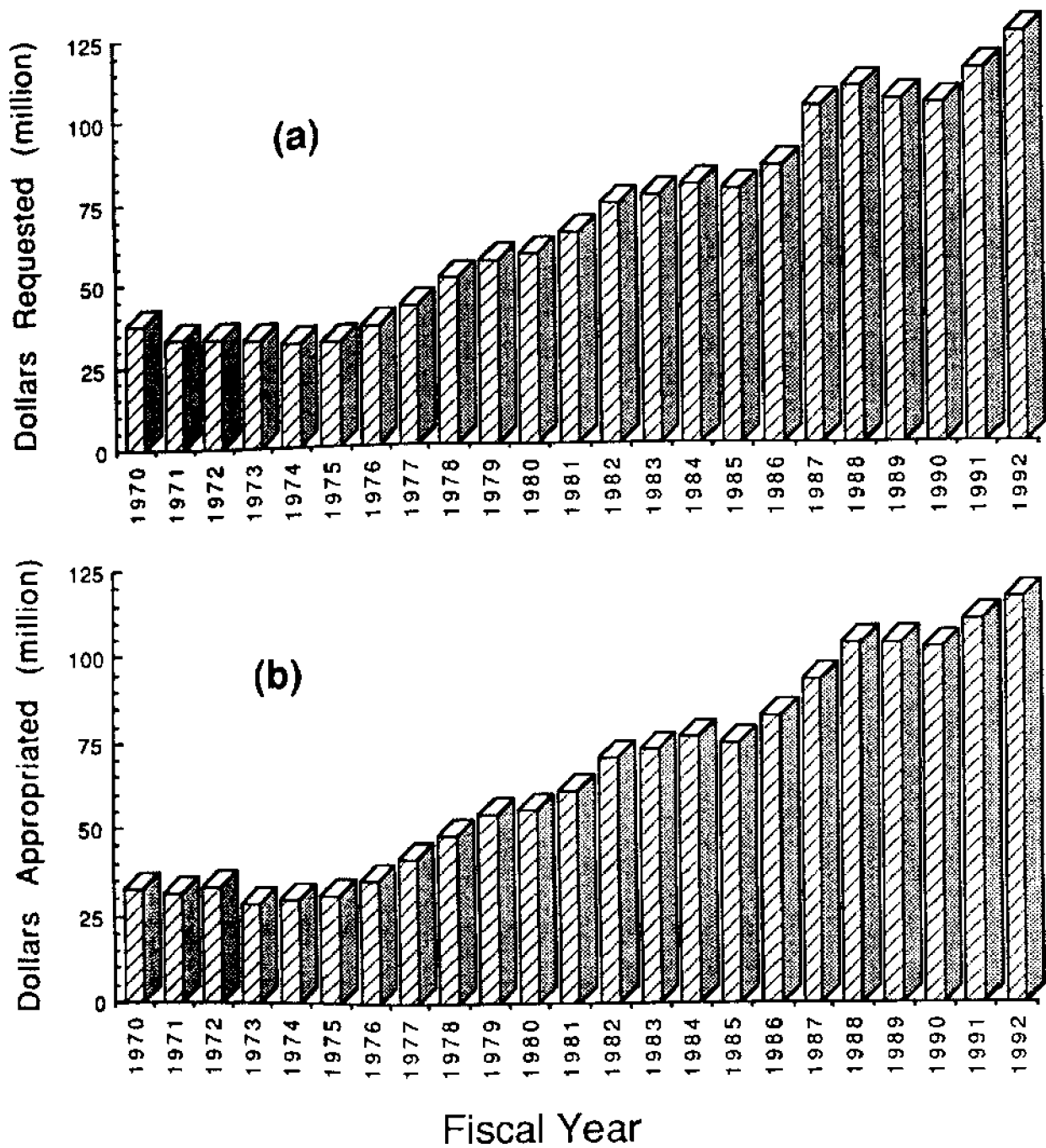


Figure 4. Office of Naval Research funding for ocean sciences.
 (a) President's budget,
 (b) Congressional appropriations.

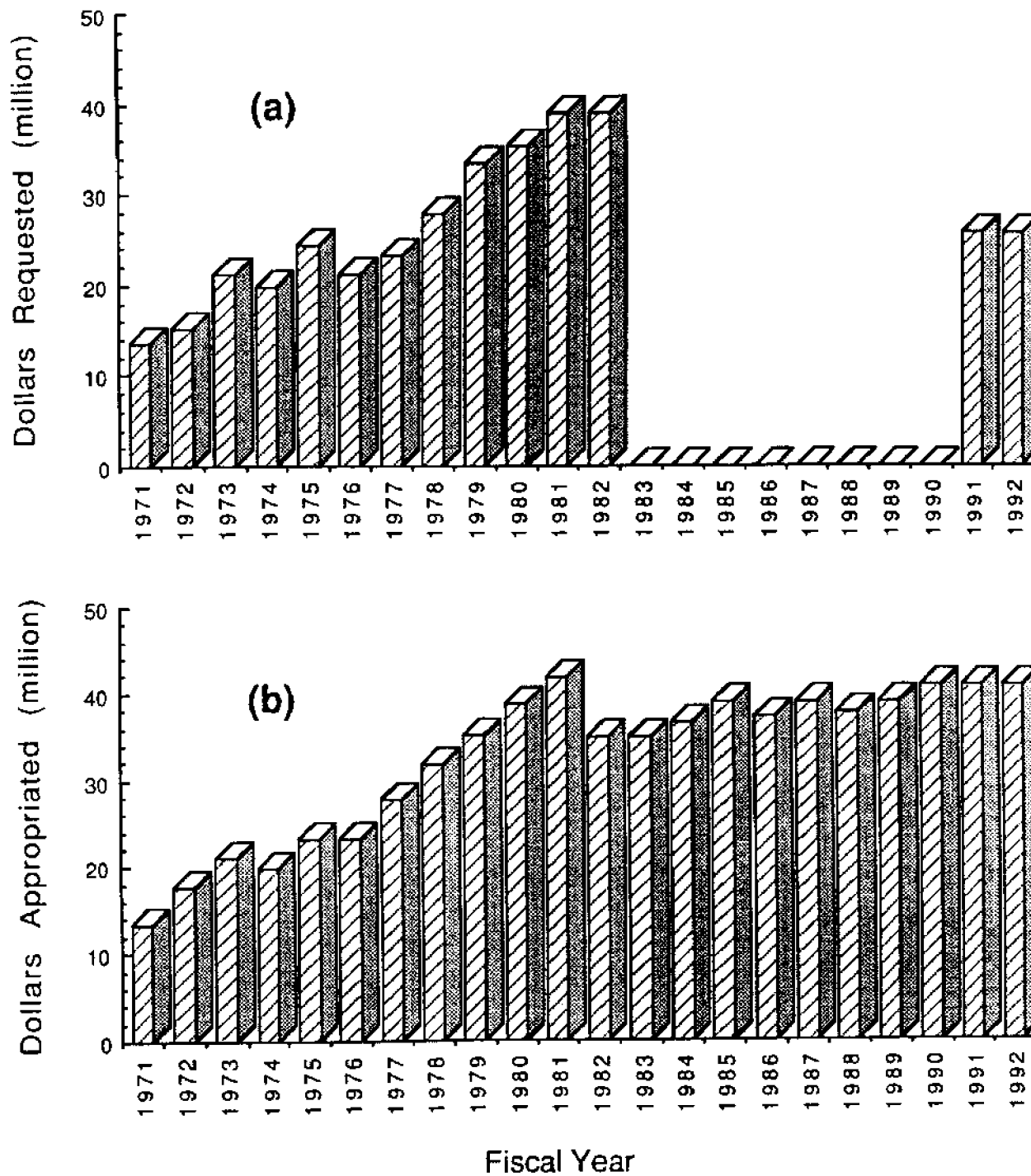


Figure 5. National Sea Grant College Program federal funding.

- (a) President's budget,
- (b) Congressional appropriations.

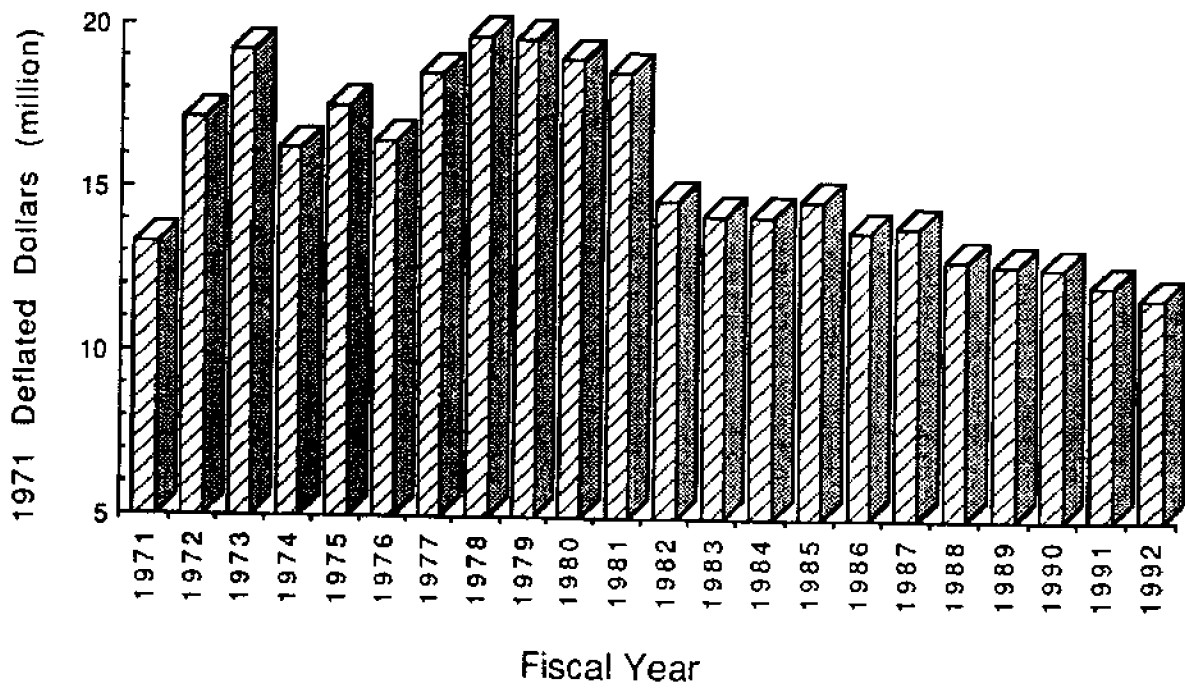


Figure 6. National Sea Grant College Program federal appropriations in constant 1971 dollars.

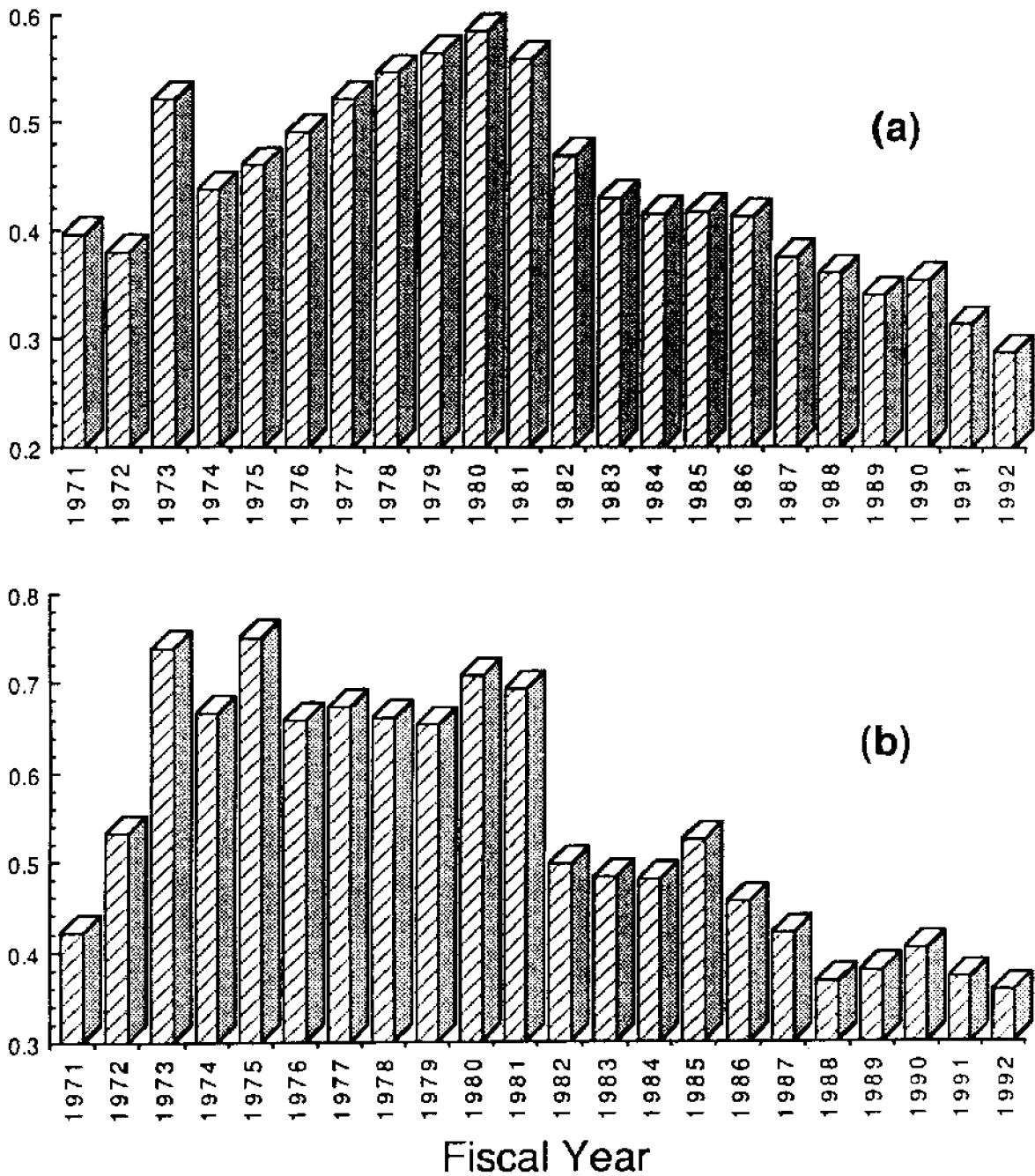


Figure 7. Ratio of National Sea Grant College Program federal appropriations to the ocean sciences appropriations of other agencies:

- (a) National Science Foundation,
- (b) Office of Naval Research.

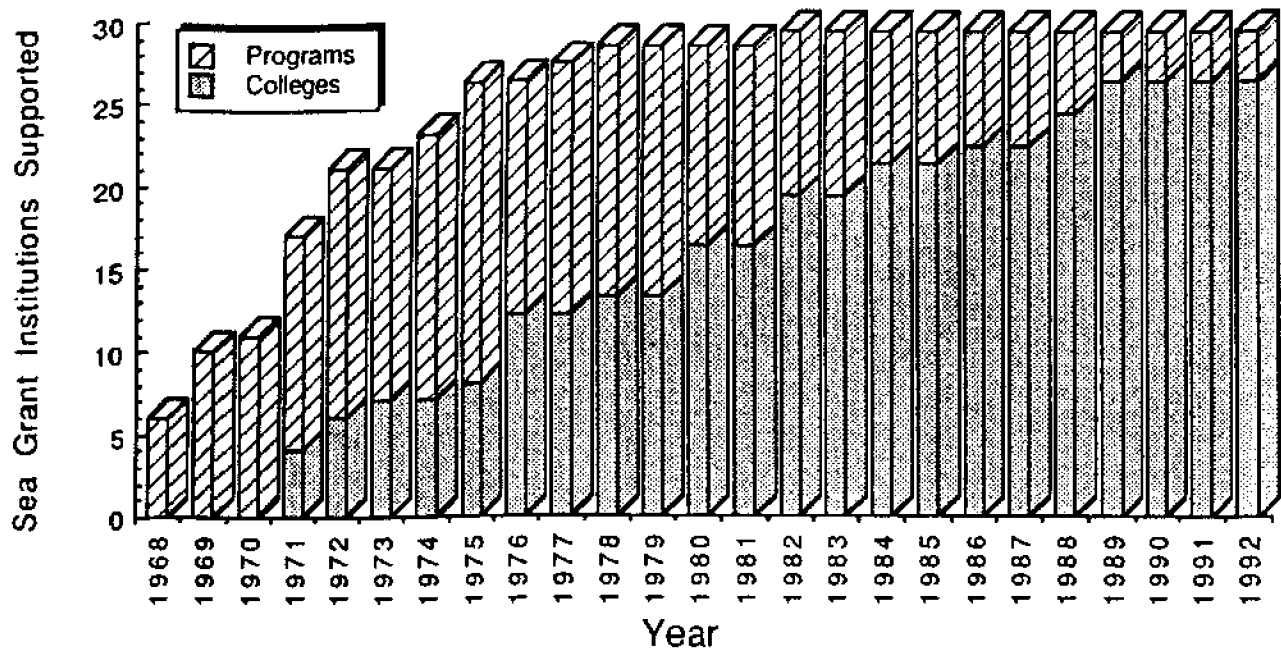


Figure 8. Number of NSGCP institutional grants showing the early growth in total institutions supported *versus* the steadier growth in the number of Sea Grant Colleges.

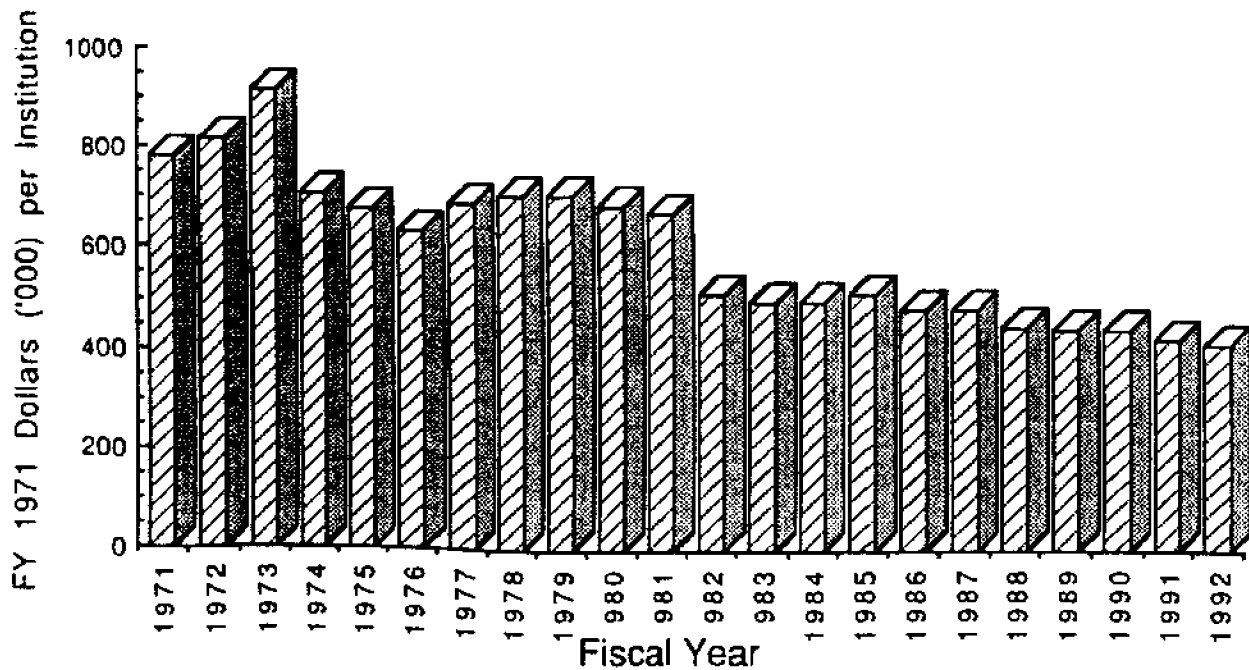


Figure 9. Average NSGCP federal appropriations per Sea Grant institution in constant 1971 dollars.

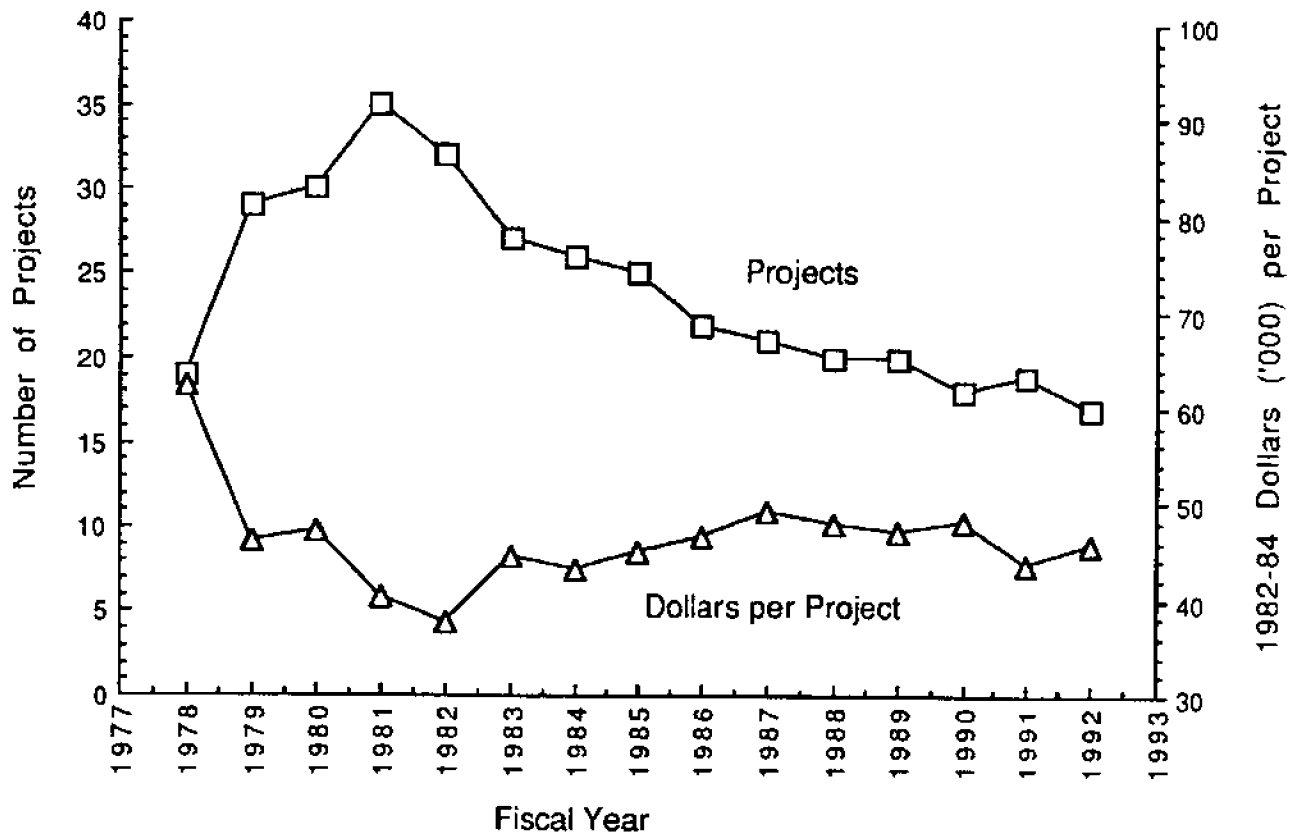


Figure 10. Example of the impact on one Sea Grant College program of the combination of declining federal appropriations (in deflated dollars) and increasing numbers of programs.

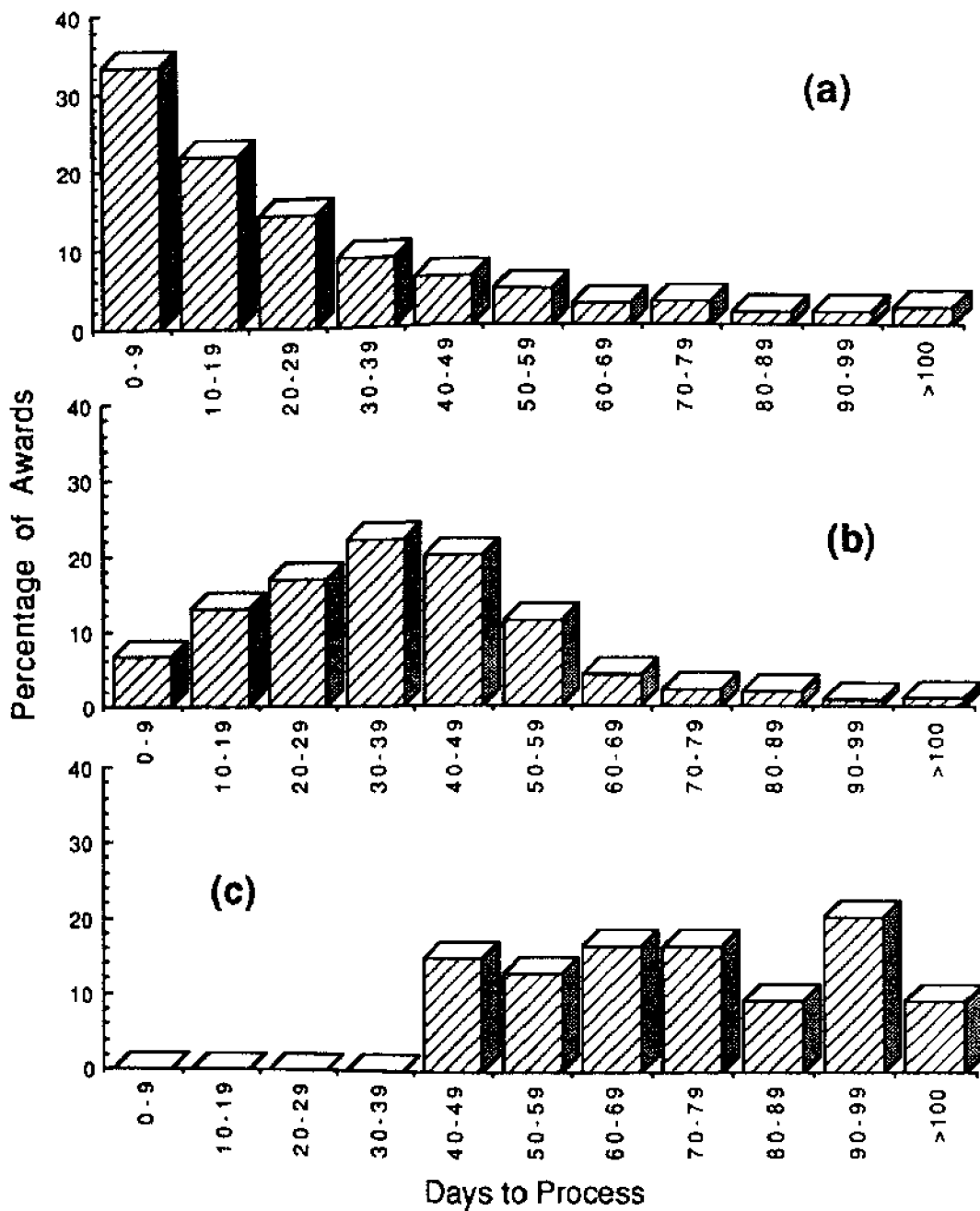


Figure 11. Administrative time required by federal agencies supporting ocean sciences to process research grants to university investigators after completion of external and internal scientific reviews:

(a) Office of Naval Research, data for FY1991.

(b) National Science Foundation, data for FY1990-1992. Because the time measured is from the completion of a scientific program manager's review to the start date of a grant, some of the longer times reflect early submission of proposals by PI's, rather than purely administrative processing times.

(c) National Sea Grant College Program, data for FY1992.

APPENDIX I

Selected Accomplishments of the National Sea Grant College Program

A. Seafood harvesting and management.

1. **Sea scallops.** As a result of Sea Grant-funded research, the valuable sea scallop fishery off the east coast, from Massachusetts to the Carolinas, is changing its management strategy. The Sea Grant-supported studies showed that earlier techniques for evaluating and thereby managing shucked and unshucked harvests were inequitable and difficult to enforce consistently. Instead, the researchers showed that effort and gear controls, combined with a minimum size limit, lead to better management. The Sea Grant researchers also developed the basic knowledge that forms the basis for good manufacturing practice in the use of sodium tripolyphosphate (STP) in processing scallop meat.
2. **Liquefied Natural Gas (LNG) as a substitute for diesel fuel.** Sea Grant researchers in the Gulf of Mexico, in response to escalating diesel prices in the early 1980s, demonstrated that by using LNG for refrigeration and fuel, shrimp boats could cut fuel costs by as much as 50 percent. The use of LNG fuel can also eliminate diesel emissions which contribute to unacceptable air pollution in areas such as coastal Southern California.
3. **Triploid oysters.** Normal fertile oysters put much of their energy during summer months into reproduction, leading to a mushy texture and a decline in flavor that greatly reduce their market value. Sea Grant researchers in the Pacific Northwest developed a reliable technique for producing triploid (sterile) oyster that retain their texture and flavor during the high-demand summer months. This technique has been scaled up to commercial production, thereby adding millions of dollars to the value of the oyster industry.
4. **Insurance costs for commercial fishing vessels.** In the late 1980s increases in insurance rates for fishing vessels threatened the economic viability of sectors of the industry. Sea Grant researchers in the Northeast provided the information upon which the Commercial Fishing Vessel Safety Act of 1988 was based. By following this up with operator training courses, Sea Grant contributed to a significant lowering of insurance costs to the fishing industry.
5. **Hybrid striped bass cultivation.** Because the demand for striped bass has outrun the supply from wild stocks, Southeast Sea Grant researchers and extension agents have developed and transferred to the commercial sector reliable techniques for raising hybrid striped bass. The researchers have also developed reliable techniques to differentiate wild and cultured fish, thereby ensuring that protected wild stocks do not enter the market under false cover.

As a result of these efforts, hybrid striped bass are not only helping to meet consumer demand, but are providing new industries and employment to the Southeast coastal plain.

6. Whitefish aquaculture in the midwest. Sea Grant technical advice and hands-on assistance has resulted in private investment in new facilities that provide employment in economically depressed areas of Wisconsin and Minnesota. This enterprise involves private entrepreneurs, Indian tribes, and state and county officials.
7. Soft-shell crabs. Sea Grant programs from New Jersey to Texas have conducted research that promoted the growth of the soft-shell crab industry. Researchers and extension agents have advanced the performance of shedding crabs by improving water quality, enhancing product quality, developing methods for recirculating water, etc. By transferring the technology to potential growers via workshops and technical manuals, Sea Grant fostered an industry that has grown during the past decade from almost nothing to one that yields annual gross sales of more than \$40 million and provides 4,000 jobs in 12 states.
8. Surimi. Sea Grant research has boosted the expansion of a domestic surimi industry. Surimi, a minced fish paste, was originally developed by the Japanese. The paste is formed into imitation seafood products such as flaked crab, crab legs, and scallops. Through Sea Grant research, scientists have adapted the Japanese technology for U.S. producers using cheap, abundant species of fish found along the East and West coasts. Now, an ever-growing U.S. surimi industry (\$200 million in annual sales) is boosting domestic fish prices and helping to feed a population hungry for cheaper seafood products.

B. Conservation and management of wetlands and estuaries.

1. Charleston Harbor Estuary. Sea Grant organized a graded approach to the long-term management and development of the Charleston Harbor estuary which began with extension and technical workshops. These workshops involved business, industry, port operations, environmental groups, regulatory agencies, the military, local government, and concerned citizens. This led to an *ad hoc* group which prepared white papers on water quality classification, nonpoint and point source pollution, fisheries, land use planning, and historical/cultural resources. The group also developed a public outreach agenda that included:
 - volunteer water quality monitoring
 - in-service training for teacher recertification
 - public presentations
 - special events (such as a waste oil recycling day)
 - a high-school curriculum guide

The group ultimately obtained a commitment of \$3 million to prepare a special management plan for the estuary. This was a classic example where Sea Grant's neutrality, access to organizational and scientific expertise, and outreach capability allowed it to play a pivotal role in bringing mutually suspicious parties together to develop and implement a plan to manage a valuable shared resource.

2. Natural *versus* artificial wetlands. In many parts of the country, a large fraction of the original estuarine wetlands has been "reclaimed" for agricultural or urban uses. To offset this trend, efforts are underway to mitigate the loss by restoring damaged wetlands or creating new ones in undeveloped areas. In California, Sea Grant has played an important role in determining whether such mitigation efforts have met their ecological goals. The research has developed methods to compare natural and artificial wetlands, and has shown that nutrient cycles, the organic content of soils, and the establishment of food webs are sensitive indicators of wetland behavior. One product of the work is a manual to guide both mitigators and the agencies responsible for evaluating the success or failure of such efforts.
3. Delaware Estuary. The National Estuary Program on the Delaware, which is designing the conservation and management program for the estuary, draws heavily on long-term biogeochemical studies supported by Sea Grant. Detailed and comprehensive sampling of the entire estuary by as many as 13 cruises per year for up to 14 years provides a record of the temporal and spatial chemical and microbiological variations within the estuary that allow natural and human-induced effects to be recognized and taken into account in developing the management plan.
4. Chesapeake Bay. See under "Pass-Through" projects (Section F., below).

C. Waste management.

Seafood processing plants have long had difficulty in disposing of their organic-rich waste products. Sea Grant programs have provided a number of innovative solutions to this problem.

1. Chitosan. The chitinous carapaces of crustacea, which decompose slowly, are a major byproduct of shrimp, crab and lobster processing plants, and are a raw source of chitosan. Sea Grant-funded research in Washington has shown that chitosan is a "signal" compound that triggers a disease resistance reaction in plants and dormancy of fungi. Chitosan has proven to be a valuable resource that promotes mold resistance and enhanced germination of wheat, and has potential for more tolerable contact lenses and other medical treatments.

The commercial demand for chitosan for agricultural uses is already threatening to overwhelm the supply of this formerly discarded resource.

2. Composting. In such states as Florida, Maryland, New York and Wisconsin, where the landfill disposal of fish wastes is environmentally undesirable and practically difficult, Sea Grant researchers and extension agents have helped to develop and improve composting procedures for such wastes. The result in Wisconsin, for example, is that millions of pounds of former waste have become a valuable resource that is produced and aggressively marketed by new companies.

D. Elementary and secondary education.

Virtually every Sea Grant program has success stories to point to in enhancing school children's knowledge of marine and estuarine resources and habitat. The approaches used and the issues addressed are as diverse as the coastal states themselves.

1. Global change. Sea Grant has led the way in providing teachers with instruction and materials that explain the current knowledge and controversy about "global change" in a way that can be presented to school children. Educators from at least 18 states have participated in workshops and formal courses from the Gulf Coast to the Pacific Northwest to learn about Global Change issues.
2. Science and the environment. The Earthwatch radio program, co-produced and distributed by Wisconsin Sea Grant, produces weekly series of five 2-minute reports that are heard over 130 commercial and public radio stations by millions of people. This program, which has provided science writing and professional experience to more than 50 college students, has been recognized by state, national and inter-national awards.
3. Teachers guides and "hand-on" exposure of school children to coastal estuarine issues. Examples of the dozens of such programs include:
 - The Texas *Marine Education Symposium*, which attracts an average of 1200 ninth to twelfth graders and their teachers per year, and *Summer Ocean Awareness Retreat*, where students spend a week camping on Matagorda Island learning about marsh, dune and barrier island ecology, marine biology, and fish identification and conservation.
 - The New Jersey kindergarten through twelfth grade field trips which draw on the results of earlier Sea Grant projects to expose 10,500 students per year to marine and environmental issues.
 - The Mississippi -- Alabama *Project Marine Discovery* which is a hands-on field trip program in which more than 14,000 elementary and secondary school children and their teachers each year learn about the environments of the Gulf Coast and the Gulf of Mexico.
 - The Alaska *Sea Week Curriculum Series*, which is a six-volume graded series on Alaska's fresh and saltwater ecosystems for elementary school children. This series, which cover plants, fish, insects, birds, and animals, is a mainstay in schools throughout Alaska.
 - South Carolina's *Sea Things ... Objectively* which responds to an assessment that showed that the teachers of seven to twelve year olds were unaware of available marine educational materials and were uncomfortable teaching the basic scientific concepts that form the foundation of marine science. The Sea Grant program trains groups of 100 to 120 teachers and is overwhelmed by demand for more training workshops.

E. Public education.

Most Sea Grant programs are active in public education through lectures and workshops, as well as publications ranging from pamphlets to books (the Washington program's acclaimed "Puget Sound" series, for example). Award-winning films and videos, such as those produced by the Oregon and Maryland programs, have reached and informed TV audiences nationwide.

The diversity of such activities is illustrated by the Puerto Rico program's bilingual information on marine and seafood safety, which covers topics as varied as avoiding the bends and the risks of getting ciguatera from various species of fish.

F. "Pass-Through" research projects.

The capability of the Sea Grant network and the managerial expertise of the Sea Grant programs have been recognized by other divisions of NOAA and by other federal agencies. These entities have often elected to transfer tasks and funds to the NSGCP office for routing to the appropriate Sea Grant program(s), rather than to contract directly with the parent universities.

Every one of the 29 institutional programs supported by the NSGCP has participated in "pass-through" projects which, in FY 1991 alone, totalled \$12.2 million and involved the U.S. Army, U.S. Coast Guard, Department of Energy, Department of the Interior, EPA, U.S. Navy, U.S. Geological Survey, and more than 10 NOAA offices.

Examples of the dozens of "pass-through" projects include:

- EPA support for lake-wide management of the Great Lakes being coordinated through the Minnesota Sea Grant Program.
- Multi-agency support for the Heard Island experiment to test the feasibility of measuring small changes in the travel time of sound pulses from the southern Indian Ocean to coastal sites around the world. This test of a technique to detect ocean-wide warming due to global climate change was coordinated through the Washington Sea Grant Program.
- EPA and NOAA support for work on Chesapeake Bay, one of the nations' most important estuaries. Particular attention has been focussed on dissolved oxygen and on the behavior of toxic compounds in the estuarine system. The multi-institutional research teams which linked two states, federal agencies, and academic institutions were coordinated by the Maryland and Virginia Sea Grant Programs.

This list is only a small and somewhat arbitrary sample of Sea Grant activities. The NSGCP Office or individual programs can provide hundreds more.

APPENDIX II

The Regulatory Environment for University Science

[From position paper prepared by the
Council on Governmental Relations,
National Association of College and University Business Officers]

April 24, 1992

<u>Regulation</u>	<u>Requirement</u>	<u>Burden</u>
Drug-Free Workplace (P.L. 100-690)	development of drug-free workplace policy	specific agreements with each employee on a Federal grant or contract; notification to Federal agency of violation
Drug-Free Work Force (DOD only) (DFARS 223.570)	requirements of drug-free workplace plus supervisory training and random drug testing	increased cost of supervisor training and drug testing
Drug-Free Schools and Campuses Act (PL 101-226)	annual distribution in writing to each employee and student describing standards of conduct, legal sanctions, health risks and counseling, treatment and rehabilitation with respect to use of illicit drugs and abuse of alcohol	one institution reports an annual expenditure of \$37,000 for compliance
Lobbying (Byrd Amendment) (P.L. 101-121)	requires disclosure of lobbying activities regardless of source of funds; prohibits lobbying with Federal funds	most agencies requiring separate lobbying certification for each proposal
Davis Bacon Act (P.L. 86-624 & 88-349)	payment of not less than minimum wages to laborers and mechanics; wages paid at least once a week	requirement for prevailing wage determinations
Walsh-Healey Public Contracts Act (41 USC 35)	imposition of fair social employment standards on government contractors	requires compliance with minimum wage, child and convict labor restrictions and work safety provisions
Service Contract Act (41 USC 351)	requires minimum wages and fringe benefits, safe and sanitary working conditions, notification to employees of the minimum allowable compensation, and equivalent Federal employee classifications and wage rates	applied research and services contracts may contain this clause which has impact on employee compensation packages

Regulation

Contract Work Hours and Safety Standards Act of 1962
(40 USC 327-333)

Misconduct in Science
(FR, 5/14/91 & FR, 8/8/89)

Procurement Integrity
(41 USC 423)

Debarment and Suspension
(ED 12549)

Covenant Against Contingent Fees
(FAR 52-203-4)

Anti-Kickback Act of 1986
(FAR 52.203-7)

Officials Not to Benefit
(FAR 52.203-1)

Buy American Act
(41 USC 10)

Fly America Act
(FAR 52.247-63)

Competition in Contracting

Requirement

prescribes protection to laborers and mechanics employed on government contracts and prescribes forty-hour work week with paid overtime at a rate of not less than one and one-half times the rate of basic pay

development of institutional procedures to respond to allegations of misconduct

prohibition of certain activities by competing contractors, government procurement officials, and other individuals during the conduct of a Federal agency procurement process

provides sanctions to individuals or entities for fraudulent or improper use of Federal funds

requires that no individual or firm can be paid a contingent fee to secure government contracts

prohibits payment to subcontractors by prime contractors when such payments were made for the purpose of improperly obtaining or rewarding favorable treatment in connection with either a prime contract or subcontract relating to a prime contract

prohibits members of Congress from benefiting from a federal contract

requires each end product to be substantially mined, produced or manufactured in the US

requires that US flag carriers be used for personal transportation and property when US funds used; very few exceptions

requires full and open competition for US government procurements

Burden

requires payment of minimum wage and overtime payment

two agencies have developed regulations with differing definitions and requirements; each agency has own procedures for also following up on misconduct allegations

requires certification on all contracts or modifications over \$100,000 annually

in most cases, requires separate certification on each proposal

formal certification is usually required when proposal for funding submitted

both prime and subcontractors must have policies in place to prevent and deter possible violations of statute

clause placed in all contracts

difficult to enforce by institutions as manufacture of supplies and equipment component parts made internationally

enforcement of act is cost ineffective in many cases

act is applicable to government agencies

Compliance Regulation

Implementation Impact

Burden

Export Administration Act and Arms Export Control Act

under certain conditions, provides for restrictions on export of technology, including scientific and technical data

while exemptions are made for fundamental research, universities may have clause in contracts which has caused some to decline funding

Insurance - Immunity From Tort Liability (FAR 28.301)

contractors receiving cost-reimbursement r&d contracts must provide liability from injuries to third parties

insurance must be provided if not totally or partially exempt from tort liability

Prompt Payment (P.L. 97-177)

provides for payment of interest to contractors due to late payment by the Government of invoices

contractor must submit proper invoices

Non-Delinquency of Federal Debt (OMB A-129)

requires that federal agencies take appropriate steps to insure that those receiving federal financial assistance are not delinquent on loans or other accounts to the federal government

contractors must certify that they are not delinquent

Certificate of Current Cost and Pricing Data (FAR 15.801-1)

provides that cost and pricing data submitted is accurate and current

certification required when contract is or becomes in excess of \$100,000; DOD has exempted universities from requirement

Certificate of Technical Data Conformity (DFARS 252.227-7036)

requires that technical data delivered under a DOD contract is complete, accurate, and in compliance with requirements

institutions are required to submit certification when technical data is delivered; such certification may be made by an appropriate institutional designee (such as principal investigator)

Certification of Accuracy of Indirect Costs (DOD 242.770)

requirement that all institutions receiving DOD contracts certify under penalty of perjury and all indirect costs are allowable and properly allocated

requires certification by CPO

Student Unrest

requirement annually in HHS appropriations act that no payment can be made to individuals involved in campus student unrest after August 1, 1969

enforcement virtually impossible

Acknowledgment of Federal Grant Support (Stevens Amendment)

requirement on any statements or other documents funded in whole or in part with Federal money, that percentage of total costs, dollar amount of Federal funds, and total costs of project be clearly stated

institutions required to provide detailed funding information on any announcements, bid documents or other solicitations

Compliance Regulation

The Coordinated Review Process
(EO 12372)

Rights to Inventions Made by
NonProfit Organizations and Small
Business Firms
(37 CFR Part 401)

Resource Conservation and Recovery
Act (RCRA), reauthorized in 1984 for
hazardous and solid wastes
(40 CFR 260-265, 270)

Underground Storage Tanks
(40 CFR 280)

Toxic Substance Control Act
(40 CFR 761)

Right to Know regulations (Hazard
Communication Standard), 1987
(29 CFR 1910.1200)

Implementation Impact

Mandates state-level review of certain
federal programs after rescission of
OMB A-95. Purpose of review stated
as coordination of development and
support money.

Vests title to patentable ideas
conceived or developed under federal
sponsorship in nonprofit organization
or small business subject to certain
conditions.

Brought small quantity hazardous
waste generators, including colleges
and universities, into the regulated
community.

Requires underground storage tanks
to meet standards relating to corrosion
protection and the prevention of spills
and overflow, and requires new
systems to be equipped with leak
detection devices.

Regulates polychlorinated biphenyls
used in electrical transformers.
Educational institutions must comply
with EPA regulations concerning use,
service, storage, and disposal of
transformers containing PCBs

Requires employers to provide
employees with certain information
regarding chemical identity, safety,
and related health effects of materials
with which they come into contact
while on the job.

Burden

Requires submission of proposals to
state review office normally 45 days
before submission of proposal to
federal agency

Requires faculty awareness programs,
sharing of royalties, and preference for
U.S. industry in licensing activities.

Based upon level of generation
(conditionally exempt small quantity
generators, small quantity generators,
fully regulated generators)
requirements vary, but all include the
identification of all hazardous waste
generated, shipping to approved
waste facility, and limits on
accumulation of wastes. Requires
extensive administrative support.

Requires reporting of installation of
tanks, suspected releases, confirmed
releases, to proper authorities.
Records must be kept to show
compliance, and may vary depending
upon regulatory authority. Imposes
requirement to have annual aggregate
insurance.

Requires registration, visual
inspection, reporting, marking, and
mandates requirements for storage
facilities and recordkeeping.

Requires labeling of containers,
preparation of material data sheets,
dissemination of information about
hazards in specific work environments
and training about hazardous
chemicals on employment and with
introduction of any new hazardous
substance.

Compliance Regulation

Historic Preservation
(Section 106 of National Historic
Preservation Act of 1966)

Civil Rights Act of 1964
(P.L. 88-352), codified at 42 USC
20000D et seq.

Employment of the Handicapped -
Rehabilitation Act of 1973
(20 USC 793; 29 USC 794; FAR 22.14)

Americans With Disabilities Act, 1990
(P.L. 101-336)

Sex Discrimination (Title IX, 1972)
(P.L. 92-318, codified at 20 USC 1681-
1686)

Age Discrimination
(P.L. 94-135, codified at 42 USC 610 et
seq.)

Equal Employment
(EO 11246; FAR 52.222-26)

Implementation Impact

Activities which involve construction,
acquisition, or modification of any
items on registry require coordination
between awarding agency and
recipient institution.

Bars recipients of federal funds from
excluding persons because of race, sex,
color, or national origin

As a condition of award, institution
must execute either with each award
or have on file with agency an
assurance that federally funded
activities will be made available and
accessible to handicapped persons and
that there will be no discrimination
based on handicap

Extends protection as in Civil Rights
Act of 1964 to individuals with
disabilities.

Prohibits exclusion of individual on
basis of sex from any education
program or activity receiving federal
support.

Prohibits unreasonable discrimination
on the basis of age in any program or
activity receiving federal assistance. In
actuality, adds age to the Civil Rights
Act of 1964

Requires equal opportunity without
regard to race, sex, color, religion, or
nationality to persons employed or
seeking employment.

Burden

Normally requires clearances to be
secured from appropriate State
Historic Preservation Office prior to
submitting application.

At time of award, requires an
institution to certify, or to have
previously certified, to an Assurance
of Compliance that it will take all
steps necessary to comply with the
statute

Requires execution on agreement by
agreement basis or having executed
agreement on file at agency

Required access to public
accommodations in January 1992 and
requires full action employment by
July 1992. May include significant
cost to comply with all terms of act.

Some federal agencies require no
additional certification to that of Civil
Rights Act of 1964 but some require
an additional certification that there is
no discrimination based upon sex.

Some agencies require a certification;
others have no proactive requirement
to certify.

Requires acceptance of FAR clause in
contracts and for contracts and
subcontracts over \$1 million requires
preaward compliance review by
regional office of Federal Contract
Compliance Program officials.

Compliance Regulation

Implementation Impact

Burden

Affirmative Action for Special Disabled and Vietnam Era Veterans (38 USC 2012; 41 CFR parts 60-250 and 61-250, FAR 52.222-28)

Employers are to list all suitable employment opportunities with local employment service office and take affirmative action to employ and advance qualified special disabled veterans and veterans of the Vietnam Era without discrimination based upon disability or veteran's status.

Requires listing of such employment opportunities and annual submission of report on such employment with Department of Labor.

Utilization of Women-Owned Small Businesses (15 USC 631-647, EO 12138, FAR 52.219-13)

Directs agencies to take appropriate action to facilitate, preserve, and strengthen women's business enterprise.

Requires acceptance of FAR clause in contracts over \$25,000.

Utilization of Labor Surplus Area Concerns (44 CFR 331, 20 CFR 654, Subpart A; 15 USC 644 (d),(e),(f); FAR 52.220-3)

Assures appropriate contracts will be awarded to eligible Labor Surplus Area concerns

Requires contractors to take proactive steps to subcontract with labor surplus area concerns when consistent with efficient contract performance and reasonable cost. May require development of Labor Surplus Area Subcontracting Programs.

Utilization of Small and Small Disadvantaged Business Concerns (15 USC 631-647, 13 CFR 125.4(g)(7) P.L. 95-507; FAR 52.219-8 and 9)

Provides maximum practical opportunity to small and small disadvantaged businesses to participate in contract performance

Requires submission and approval of a subcontracting plan that includes percentage goals, plan administrator, description of efforts to ensure utilization of such concerns, and maintenance of records to show good faith effort to comply. Requires substantial education of faculty to seek such businesses.

Confidentiality of Patient Records (P.L. 92-255, Section 408, 21 USC 1175, P.L. 91-616, Sect. 333; 42 USC 4582; 42 CFR 2)

Protects persons with substance abuse problems who seek treatment

Requires records of patients seeking treatment for drugs and alcohol to be maintained confidential except when necessary for medical treatment purposes. Institutions must develop policies to enforce such confidentiality.

Clean Air Act and Clean Water Act 42 USC (42 USC 7401; 33 USC 1251 et seq.; EO 11738; HO CFR, Part 15)

Prohibits use of facilities listed by the EPA as violators of these acts to be used for performance of government contracts

Requires certification at time of proposal submission that facilities proposed for use are not listed as violators by the EPA and to comply with provisions of these acts at any facility where federal contract work is carried out.

Compliance Regulation

Implementation Impact

Burden

Hazardous Materials
(40 USC 327-330; 29 CFR, Part 5, PAR, Subpart 23.3; OMB A-110, Attachment O)

Institutions must notify employees of hazards in the workplace describing hazard, symptoms, and precautions.

Requires identification and notification system and completion and submission of Material Data Safety Sheets for all hazardous materials within five days before delivery of material.

Human Subjects Compliance
(P.L. 93-348, Implemented by 45 CFR 46. Final rules 56FR 28004)

Sets forth common federal policy for the protection of human subjects. Applies to each federal agency supporting research involving human subjects.

Requires institutions to provide written assurance of compliance with regulations set forth in the policy, including statement of principles governing the institution, establishment of institutional review boards (IRBs) to review protocols for use of humans as subjects, and written procedures to be used by the IRBs for the conduct of their business. The availability of general assurances lessens the administrative burden, but the new requirement for full review prior to submission of noncompeting proposals is particularly burdensome. The submission of separate certification forms for each proposal and on an annual basis is costly and imposes additional administrative burdens.

Use of Animals in Research (Animal Welfare Act)
(P.L. 89-544 as amended by P.L. 91-579, 94-279, 99-198; 7 USC 2131 et seq; CFR, Title 9, Subchapter A, parts 1-4; NIH Guide 85-23)

Sets forth policy to ensure that animals used in research, for exhibition or as pets receive humane care and treatment. Provides for regulation of transport, purchase, sale, housing, care, handling and treatment of animals.

Requires institutions to provide written assurance of compliance with regulations implementing the Animal Welfare Act (USDA), the Guide for the Care and Use of Laboratory Animals (PHS) and other applicable laws and regulations; requires the institution to appoint and maintain a committee to provide oversight of its animal care program. The assurance must indicate how the institution will review its facilities, either by AAALAC accreditation or annual review of the institution's established committee. A complete new assurance must be submitted every five years and annual reports are required.

Compliance Regulation

Marine Mammal Act
(P.L. 92-522)

Research Involving Recombinant DNA
Molecules
No statutory authority, guidelines
issued by NIH May 7, 1986 (51 FR
16958)

Implementation Impact

Organizations wishing to use marine mammals in research must apply for and receive a permit specifying the number and kind of animals to be used and the period of time for which the permit is requested.

Specifies practices for constructing and handling recombinant DNA molecules, organisms, and viruses containing recombinant DNA molecules

Burden

Requires institutions to state in proposals that they will comply with the act; requires reports periodically to the Department of Commerce

Requires institutions to establish and implement policies that provide for safe conduct of DNA research establishment of an Institutional biosafety committee (IBC) to review all protocols proposing use of recombinant DNA molecules. Some approvals are appropriate at committee level, some must be approved by NIH