

Committee on Resources

Witness Testimony

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The National Association of State Universities and Land-Grant Colleges

REAUTHORIZATION OF THE THE NATIONAL SEA GRANT COLLEGE PROGRAM

Mr. Chairman and members of the Subcommittee, I very much appreciate the opportunity to appear before you today to testify on H.R. 437, the Marine Resources Revitalization Act of 1997, a bill to authorize appropriations for the National Sea Grant Program. I want to commend you Mr. Chairman for your outstanding leadership in crafting an excellent bill and for conducting these important hearings.

I am Dr. Leonard F. Pietrafesa, Director, Marine, Earth, and Atmospheric Sciences, North Carolina State University. I am providing this statement for the National Association of State Universities and Land-Grant Colleges (NASULGC). I have a long and active involvement in the Association and currently chair its Board on Oceans and Atmosphere (BOA). The Board is composed of over 300 of this nation's most eminent research scientists and its mission is to serve society by promoting the use of advances in scientific understanding to address societal problems, and to demonstrate the importance to the nation of maintaining a strong and diverse capability in research and education in the marine and atmospheric sciences.

I have a long history of interest in issues concerning the wise use of our nation's marine and coastal resources, and served on the National Research Council Committee which reviewed the Sea Grant Program in 1994.

I am proud to be testifying on behalf of NASULGC. Founded in 1887, NASULGC is the nation's oldest higher education association. A voluntary association of public universities, all the land-grant institutions, and many of the nation's public university systems, NASULGC has over 190 members and campuses in all 50 states and the U.S. territories. Its overriding mission is to support high-quality public education through efforts that enhance the capacity of member institutions to perform their traditional roles of teaching, research, and public service.

The National Sea Grant College Program was created by Congress in 1966 and is dedicated to enhancing the nation's ability to develop, use, and manage our coastal and marine resources. Sea Grant's mission in the area of marine and coastal sciences bears many conceptual similarities to the nation's Land-Grant universities, which have done so much to improve the quality of life in our nation's agricultural communities. The mission of both is to achieve the highest quality in research, education and outreach. However, **Sea Grant is the only national science program to employ a broad range of physical, life and social marine sciences to address public as well as scientific concerns through its unified approach to problem-solving through its research, education, technology transfer and advisory service components.**

The National Sea Grant College Program plays a unique role, both in improving the quality and economic stability of our nation's coastal areas, and in serving the entire nation. Sea Grant's issue-oriented focus enables the program to

address real-world problems that frequently require solutions which cut across traditional disciplinary lines. **Sea Grant funding is competitively awarded and peer-reviewed.** Sea Grant is a model for translating top-quality science into useful information for industry, government, and the public. By doing so, Sea Grant plays a major role in helping to utilize our nation's substantial investment in basic research and technology in ways that no other program, nor the private sector alone, can really do on its own.

SEA GRANT'S CONSISTENTLY HIGH RETURN ON THE FEDERAL DOLLAR

Few federal programs have shown the extraordinary results that Sea Grant has demonstrated in its three decades of existence. **Sea Grant's economic impact has been shown to greatly exceed the amount of its annual federal appropriation. Because Sea Grant is a nationally networked Federal-State partnership, the federal contribution to Sea Grant represents only about half of the annual funding of the 29 university-based programs, this is a highly leveraged federal investment as well. In constant dollars, the federal appropriation today is still far less than it was in 1980.**

Sea Grant responds exceptionally well to national priorities in promoting economic growth, of fostering responsible policies and practices in the fragile marine environment, and in transferring exciting new technologies and knowledge-based strategies to users at all levels. Sea Grant scientists have been and are contributors to scientific discovery, and most importantly in making those discoveries accessible to users who would otherwise not be able to benefit from advanced university research. The tight integration of Sea Grant's research, education, and outreach activities is a hallmark of this program, and enables Sea Grant to respond quickly and effectively to needs for our citizens who want to use and conserve coastal and marine resources for a sustainable economy and environment.

SEA GRANT AS A NATIONAL PRIORITY

Numerous studies of Sea Grant's performance have shown a consistently high level of return on a relatively small federal investment for each coastal state involved in the program. Just as the Land-Grant universities have played a key role in making the U.S. the world's most productive agricultural nation, Sea Grant is doing the same, in the marine, coastal, and Great Lakes sectors. **Members of Congress have recognized Sea Grant's success and its importance as a catalyst for economic growth. The fact that the program produces national benefits and cost savings far in excess of the resources it consumes is one reason why it has survived misguided and ill-conceived efforts to reduce Sea Grant funding. It is not practical for thirty coastal states to try to solve separately the coastal problems that are common to all or at least regional in scope. Sea Grant's local orientation, coordinated through a national network of Sea Grant programs, ensures that the taxpayer's best interests are served.**

NATIONAL RESEARCH COUNCIL REPORT

In 1993 NOAA Administrator Baker, in preparation for Sea Grant reauthorization, requested a study of the Sea Grant Program by the National Research Council. The Administrator wanted the NRC review to conduct a thorough evaluation to provide the basis for any needed changes in the program and to provide the basis for NOAA working with Congress on Sea Grant's reauthorization. I was privileged to have served on the NRC Sea Grant review Committee. The Committee was composed of a variety of perspectives from the relevant disciplines, and from state and industry interests, and in the conduct of the very thorough examination of the National Sea Grant College Program, input was sought from as many relevant sources as possible in the time allocated to us.

The Committee found that "Sea Grant has played an important role in supporting high-quality strategic research of local and national significance and has transferred research results to the industrial and environmental communities." In addition, it was the unanimous view of the Committee that Sea Grant is too important to be allowed to flounder. We were surprised by evidence of apathy and even hostility within certain elements of NOAA and the Department of Commerce regarding Sea Grant. We felt quite strongly that NOAA and Commerce must recognize Sea Grant's importance to states, industry, coastal communities and the nation, or risk losing a very successful program. We found these attitudes inconsistent with the policy pronouncements promoting federal-state-private partnerships and focused strategic research, areas where Sea Grant has excelled. Sea Grant was exactly the type of federal partnership that should be embraced as an example of various interests working together for a common good.

We identified the critical issues and related findings and made six major recommendations and several subordinate recommendations to help NOAA and Sea Grant respond to these issues. The aim was to ensure not only improvement within NOAA, but also an enhancement of the quality at the state level. I have attached the Executive Summary of the NRC Report which details the recommendations. In general we urged NOAA to undertake steps to:

Enhance the position of Sea Grant in NOAA

Develop a strategic plan and shared vision for Sea Grant

Clarify roles and responsibilities of state Sea Grant Directors, the Sea Grant National Office and the Sea Grant Review Panel

Improve and streamline program evaluation and proposal review

Increase interaction with the marine industry

Fight harder for additional Sea Grant funding

NOAA has made significant progress in implementing many, but not all, of the NRC's recommendations. I believe that the new Sea Grant director, Dr. Ronald Baird, is moving as best he can to make meaningful and substantive improvements in NOAA's management of Sea Grant.

SEA GRANT'S CORE PROGRAM

The cornerstone of the Sea Grant Program is its core program comprised of high quality, competitively funded research, which is tightly integrated with Sea Grant's education and outreach components. While Sea Grant addresses many problems of national significance, the key to its success is its local, grassroots driven approach to issues which enables

Sea Grant to tailor its efforts to local and regional circumstances. Each Sea Grant research project undergoes rigorous, scientific merit review to ensure high quality, and research priorities are driven primarily by inputs at the state and local level. Strong coordination throughout the Sea Grant Program ensures that there is no duplication of effort, and that the results of Sea Grant research and other activities are shared nationally. The following key elements characterize

Sea Grant's core program:

Emphasis on the development of broad-based programs, not just on individual projects;

Grassroots approach to project identification and the initial definition of priorities;

High degree of responsibility, authority and accountability at the university program level;

Inclusion of a broad range of scientific, engineering and policy disciplines, ranging well beyond the scope of traditional marine research;

Concern with both scientific quality and societal needs in assessing research activities;

Explicit recognition of the importance of extension and public education activities, which are tightly integrated with research efforts;

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.

SEA GRANT ACCOMPLISHMENTS

By bringing together scientists and outreach experts, Sea Grant focuses its efforts on science-based management of public resources, creating untapped opportunities in the oceans, and emphasizing non-regulatory problem-solving. **Sea Grant has an impressive record of achievements in the marine biotechnology, aquaculture, seafood safety, fisheries management and production, pollution control, education, coastal development and management, coastal engineering, and in ensuring under-represented sectors of our society are beneficiaries of and participants in Sea Grant activities.** Let me provide just a few of the countless examples:

Sea Grant's pioneering efforts in marine biotechnology are demonstrating the ability to truly revolutionize the way we use marine resources. For example, Sea Grant organized the first systematic effort in the United States to discover and develop new products from marine organisms. This effort has resulted in the discovery of more than 1,000 compounds and the awarding of fourteen patents to date, and shows enormous promise for the production of powerful antitumor compounds (known as cryptophycins), anti-arthritis agents (pseudopterosins), and antiviral drugs (didemnins and eudostomins). The promising results of Sea Grant research in these areas were reported in the Journal of the American Medical Association.

Sea Grant led the development of hybrid striped bass aquaculture, which has grown from a university research and extension project to a \$7 million fish farming industry in just seven years.

Sea Grant has shown that oyster shell proteins have many potential commercial applications as biodegradable substitutes for the chemicals currently used to prevent mineral buildup in boilers, heat exchangers and pipes, the super-absorbent materials in disposable diapers, and the chemical dispersants in detergents. This work has already resulted in awarding of several patents and the formation of two multimillion dollar corporations.

Sea Grant has discovered a hormone that stimulates reproduction and growth in crustaceans which will revolutionize crustacean aquaculture, making shrimp readily more available in world markets.

Sea Grant has successfully produced artificial antifreeze for application as a biodegradable, non-toxic spray for citrus crops and other plants from modified ice-suppressing proteins that protect fish in polar environments.

Sea Grant has developed computer models that predict where oil and other pollutants will end up once they enter a body of water which will vastly improve clean-up of oil spills.

Sea Grant spearheaded the formation of an alliance of industry, government, and universities to increase the safety and quality of processed seafood and to restore consumer confidence in the nation's seafood. This Sea Grant-led alliance is currently using sound scientific research results for use in seafood processing plants to meet or surpass federal safety requirements.

Sea Grant's recent breakthrough in welding technology will provide industry with the ability to overcome many problems associated with underwater welding and provide a more efficient and effective welding capability at half the cost.

Sea Grant has developed a new device to curtail the growing problem of harbor porpoises drowning after becoming entangled in gill nets.

Sea Grant has developed new technologies to monitor sewage outfalls, a major challenge for water quality and waste water management authorities, allowing scientists to better determine what clean-up and preventive measures are most effective -- both scientifically and economically.

Let me now focus on two issues where Sea Grant is playing an indispensable role in addressing problems of major significance to the nation.

AQUATIC NUISANCE SPECIES

Sea Grant has been a leader in addressing the problem of zebra mussels and other threatening aquatic nuisance species. Sea Grant researchers have made significant progress in understanding the behavior of aquatic nuisance organisms and in developing mitigation techniques. The National Aquatic Nuisance Species legislation which passed last year includes a new ballast water management program addressing the fact that exotic species are being continually introduced from abroad, usually in the ballast water of ocean-going ships, with potentially very damaging impacts on our aquatic environment. The Act also specifically identified Sea Grant to play a critical role in attacking this serious issue. Aquatic nuisance species represent a significant economic and ecological threat, and Sea Grant has been actively working to address these problems by (1) working with the marine transportation industry to avoid contamination of ballast water, which is the principal vector for introduction of non-native species, (2) working with state and local governments, and alerting the general public, to prevent the spread of infestation where it has already occurred, and (3) supporting competitive research to enable us to better understand threatening nuisance organisms and improve techniques for mitigation.

As an example, **Sea Grant has led the national response to the invasion of the Eurasian zebra mussel, a biofouling freshwater mollusk that poses an unprecedented threat to the nation's surface supplies of water for drinking, industry, and agriculture. Sea Grant has supported research on zebra mussel biology, how it spreads, its environmental and economic impacts, and methods for controlling it. With support from power companies and other affected industries, Sea Grant set up a national zebra mussel research information clearinghouse and organized an annual international conference to facilitate the transfer of the latest research and control information.** First found in the Great Lakes, the mussel has already spread to lakes and rivers over a 20-state area, from Oklahoma to New York and Minnesota to Louisiana. It is estimated that zebra mussels will cost Great Lakes water users alone an estimated \$5 billion by the end of the century. Recent observations have shown that the mussel is capable of reaching even greater densities (over 400,000 mussels per square meter) in the lower Mississippi River than in the Great Lakes. Sea Grant outreach staff are now providing zebra mussel information and training to resource management agencies and industries in affected inland states. **Because of Sea Grant, much progress has been made on the Zebra mussel plague. Without Sea Grant, this problem would be of a far greater magnitude than it is today.**

OYSTER DISEASE RESEARCH

Diseases such as MSX, dermo, and juvenile oyster disease pose a significant economic and environmental threat. Many productive oyster fisheries have virtually collapsed in the face of these diseases, displacing literally thousands of workers and ruining a once vibrant sector of the coastal economy. In addition, oysters have been shown to play a vital role in coastal ecosystem health by filtering nutrients and other particulates from the water they inhabit. In the Chesapeake Bay, for example, oysters once filtered the entire volume of the Bay in less than a week's time, contributing significantly to the overall water quality of our nation's largest estuary. Disease has ravaged oyster fisheries throughout the U.S. to historically low levels, and concerted action is needed if these fisheries are to have any hope of recovery.

We are convinced that Sea Grant has a critical role to play in addressing oyster disease problems, because it has already participated in the restoration of one of the nation's most productive shellfish fisheries. **Sea Grant is also working on several fronts to combat the pathogens that are devastating oyster and clam fisheries on the East Coast and Gulf Coast.** On one hand, there are the diseases, principally MSX and dermo, that ravage shellfish stocks directly, and thus reduce the supply. On the other hand, there are adventitious human pathogens that may occur in shellfish growing waters, such as *Vibrio Vulnificus* and Norwalk virus, that wreak havoc on the demand side by weakening consumer confidence. **Using DNA technologies, immunochemistry, and molecular genetics, Sea Grant researchers are developing practical methods for producing disease-resistant shellfish stocks, rapidly detecting pathogenic viruses and bacteria, and treating harvested shellfish to insure consumers' health and safety.**

Again, Sea Grant has been the primary agent addressing this problem. If Sea Grant did not exist, something like it would have to be created to respond to coastal problems which are local in origin, but national in significance, and where specific university research needs to be coordinated with government and industry.

H.R. 437

Mr. Chairman, we have reviewed H.R. 437 and we have no major concerns. In fact it is a sound piece of legislation and we want to commend you for your effort. We are particularly pleased with the sections on merit review and limitations on administrative expenses. We believe that the sums authorized, \$54.3 million for FY 1998, \$55.4 million for FY 1999, and \$56.5 million for FY 2000, are the minimum Sea Grant needs to continue its excellent work. If at all possible, we would urge you to consider increasing the authorizations of appropriations contained in this bill. This is consistent with the NRC's recommendation of increased funding for the Sea Grant Program. We understand that the need to balance the Federal budget, which we support, will impose constraints on most federal activities. However, we note that for the extensive period of time covering the 1980s and 1990s, Sea Grant was level funded and its current appropriations are undoubtedly much lower than they would have been had the program simply kept pace with inflation.

Let me add parenthetically that federally sponsored university research programs, such as Sea Grant, are a tremendous value for the government. Agencies receive the highest quality research far below the cost of doing it in house. In working to cut expenditures, agencies should not hesitate to enlist universities as their partners and take advantage of the vast reservoir of extraordinary scientific expertise, facilities and research capability of this nation's institutions of higher learning.

CONCLUSION

In conclusion, Mr. Chairman, we believe that Sea Grant is a vibrant and successful program, and is fully prepared to help the U.S. make the most of its coastal, marine, and Great Lakes resources in coming years. A thirty year track record of accomplishment more than justifies this Subcommittee's ongoing commitment to Sea Grant, and I urge your continued support for the National Sea Grant College Program.

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