SEA GRANT MARINE ADVISORY SERVICE

THE NATION'S

COASTAL TECHNOLOGY TRANSFER PROGRAM

FOR THE 21ST CENTURY

UNIVERSITY OF NORTH CAROLINA

SEA GRANT COLLEGE PROGRAM

UNC-SG-92-14

Front cover photo:
Ron Hodson, associate director of North Carolina Sea Grant, and researcher Craig Sullivan demonstrate a process for sampling the eggs of ripe striped bass to assess future fry production.

SEA GRANT MARINE ADVISORY SERVICE

THE NATION'S COASTAL TECHNOLOGY TRANSFER PROGRAM FOR THE 21ST CENTURY

EXECUTIVE SUMMARY

As Sea Grant begins planning for its fourth decade, flexibility will be crucial to planning and implementing successful and diverse Sea Grant Marine Advisory Service (SGMAS) programs in 30 coastal and Great Lakes states, the District of Columbia, Puerto Rico, the Virgin Islands and Guam. For the past 25 years, the Marine Advisory Service has played a unique role in the National Sea Grant College Program — identifying problems, finding solutions and providing informal outreach education for a broad spectrum of marine clientele. Whether it's improving fishing gear technology, helping citizens monitor water quality, assisting towns in waterfront development, promoting exports of U.S. fishery products or training a new generation of aquaculturists, the SGMAS has brought the users of marine resource information together with the sources of information and provided them with problem-solving capabilities.

The backbone of the SGMAS has always been the ability to help clientele use knowledge and research results through a broad multidisciplinary approach to public service, including outreach education, technology transfer and communications. To continue to build on these strengths and effectively meet the needs of its diverse clientele, the SGMAS must remain diverse in character and function and flexible in response to changing social, environmental and economic conditions.

In recent years, global issues have grown in importance. Concerns about global climate change have led to an FY91 presidential budget request for global climate research of over $1 billion per year. With the emergence of strong Asian and European Common Market economies, the United States finds its economic system increasingly integrated into the global economy. As evidenced by the routine and growing trade imbalances, the United States has more work to do in order to be more competitive in the international marketplace.

At the same time, space-age communication systems and innovative information technologies have allowed for an unprecedented level of information sharing. When considering many issues related to the marine business environment, thinking globally has become advantageous. In an effort to respond to their constituents, marine advisory agents and specialists are finding

they are linked to international resources on a regular basis. This trend will expand in the future, requiring expanded MAS abilities to access global knowledge resources.

Over the next two decades, the United States' coastal population is expected to rise dramatically. Indications are. that more than 60 percent of U.S. population growth since 1980 is taking place in coastal counties. By 2010, the nation's coastal population may climb by 27 percent. For the SGMAS network, this increase will create new marine-related problems to be solved as a result of growth in coastal economic activity in manufacturing, construction and service industries.

Recognizing these important trends for the future — a dramatic increase in U.S. coastal population, the emergence of a global environment and economy, an international information explosion and increasing competition for marine resources — this report on the role of SGMAS in the 21st century recommends innovative changes in program staffing, use of information technology, relationships with industry, funding approaches and the role of applied research in order to remain effective in a rapidly changing world.

Continued

Sea Grant agent Skip Kemp checks shellfish in an oyster chub grow-out system, an innovation for increasing the growth rate of oysters. (Photo courtesy of North Carolina Sea Grant.)

THE CHARGE

At a national meeting of all Sea Grant Marine Advisory Service program leaders (SGMAS) in July 1989, a committee was formed to address the question of administratively strengthening the network on a regional-national basis. The committee, made up of a representative from each Sea Grant region, the SGMAS liaison to the Council of Sea Grant Directors and a member from

Sea Grant agent Walter Hoagman turns a compost pile of fish waste and wood chips that have been processing on a northeast Michigan farm for several weeks. Composting is a way to use seafood wastes, which can be recycled as materials for enriching garden soil. (Photo courtesy of Michigan Sea Grant.)

the National Office of Sea Grant (NOSG), was charged with examining the current state of the Marine Advisory Service (MAS) network, discussing future directions for the network and providing recommendations for moving toward those directions. The charge implied a need by the committee to examine the MAS structure to improve the utilization of regional and national resources in order to improve the local impact of the program.

Subsequently, in November 1990, William Rickards, then chairman of the Council of Sea Grant Directors, and Robert Wildman, director of the National Sea Grant College Program, stated that "as we begin our third decade of Sea Grant, it is time to take stock of the way Sea Grant does business to ensure we do not stagnate and that we approach our business in the highest-energy state possible in the future."

Rickards and Wildman asked the committee to expand its charge by developing a short, concise analysis or "think piece" on how the SGMAS should develop. To ensure that the entire Sea Grant community was fully represented, a Sea Grant director and representative of the national panel were added to the SGMAS committee. The NOSG also formed other committees to provide similar analyses in other areas of outreach, education and research. The purpose of this document is to address that charge and develop further discussion throughout the Sea Grant community.

MISSION STATEMENT

A clear mission is the basis for clarifying and attaining achievable goals. It establishes the foundation for setting priorities, strategies, plans and work assignments. While it separates the urgent from the important, a strong mission statement also provides a framework that supports a common strategy with common objectives. According to policy guidelines as outlined in the 1985 Sea Grant *Green Book*, the mission of the SGMAS is:

> "... to provide an effective, two-way communication between the users and producers of knowledge. Through SGMAS, the results of scientific research are communicated to those who will apply them, and the problems and needs of these user groups are communicated to Sea Grant researchers. Advisory services are a practical mechanism for getting useful information out of the laboratories and scientific journals in practical form into the hands of those who can use it."

Continued

Many directions and trends currently unfolding will impact the ways and means by which SGMAS conducts business in the future. While the original SGMAS mission remains intact, many of today's trends and directions are reshaping, redefining and expanding the SGMAS role as we move into the 21st century.

TRENDS AFFECTING SGMAS

A. EXTERNAL TRENDS

Sweeping societal changes occurring in the United States and around the world will have a profound impact on coastal enterprises. Clients of water-based enterprises of the future are likely to significantly differ from those of the last 30 years. To accommodate clientele changes, SGMAS will need to adjust its strategies for delivering programs and services. The following trends represent important external influences that will affect the character of SGMAS programs.

1. Demographics

During the 1990s, the population of the coastal United States is expected to increase dramatically. Since 1980, over 60 percent of the U.S. population growth has taken place in coastal counties. By the year 2000, more than half of our population will be over 40 years of age, and a significant percentage will be over 65. Furthermore, people over 65 currently control 40 percent of the nation's personal financial assets. These population trends will continue to fuel a service-driven economy and exert greater pressure on the allocation of our coastal resources.

2. Emergence of a Global Community

The world is a much smaller place now than in the past, when problems and issues were usually local in nature. The growth of modem communication systems and innovative technologies has created an unprecedented level of information sharing that is transforming the global order and economy. Environmental issues, foreign trade and competition, resource management and utilization, and a myriad of other topics have taken on a global perspective. Consequently, U.S. research and information are no longer the sole source, nor necessarily the most effective means, of solving problems. The result of this global trend will require us to access global communication systems and foster stronger international ties to academic, industrial and governmental information resources.

3. Information Explosion

The use of telecommunications and computer technologies will become increasingly important in the information age. As the volume of information available to marine clientele rapidly expands, traditional SGMAS educational programming and methods may no longer be effective as clientele become more sophisticated and comfortable with electronic technology. In order to keep up with the new information explosion, SGMAS will need to be more innovative in the delivery of educational programs and use of new electronic technologies. The interpretation, condensation and synthesis of the material will also become more important in achieving useful results.

4. Technology Expansion

Increasingly, the development of new technologies (remote sensing, biotechnology, robotics, etc.) is directly impacting SGMAS user groups. In many cases, technological advancement is far ahead of practical application; but in many cases, we are beginning to see the development of new uses of advanced technology. We will need to maintain a cutting-edge ability to access, understand and interpret the potential for these complex technologies.

5. Increasing Competition for Marine Resources

Growing social, economic and environmental pressures will increase demands on our coastal resources as the allocation of these resources is sought by a myriad of competing interests. In recent years, the non-advocacy role of the SGMAS has been challenged by competing interests who vie for limited resources. Many emerging interest groups are not part of our traditional clientele. In the future, the ability of the SGMAS to provide up-to-date, objective information to assist clientele with allocation decisions and conflict resolutions will be more important than ever.

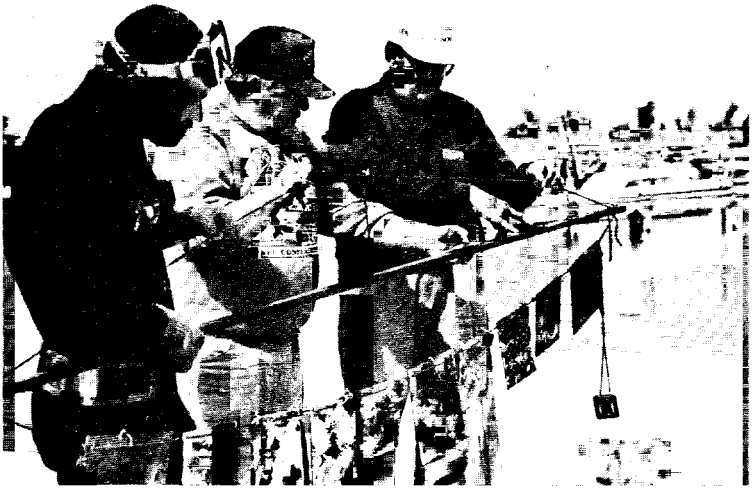
B. INTERNAL TRENDS

A number of trends observed in SGMAS programs across the country are occurring as a result of changing priorities, funding limitations and program maturation. The consequence of such change can have both positive and negative implications on how SGMAS responds to clientele needs.

1. Long-term vs. Short-term Research

For a variety of reasons, the amount of Sea Grant resources in support of applied, short-term research has decreased over the last

Continued



Sea Grant agents Ron Kinnunen and Steve Stewart show a charter captain how test plates coated with anti-foulants appear to have repelled zebra mussels in a Lake Erie marina. (Photo courtesy of Michigan Sea Grant.)

decade. During this period, research resources have shifted toward more fundamental and generic scientific questions and toward long-term issues that often require years to achieve applicable results.

The net effect of this philosophical change has been to severely impact the ability of SGMAS to be a full partner in the "feedback loop." This has reduced the likelihood for significant short-term societal impacts. Furthermore, it has necessitated many SGMAS personnel to perform an applied research function for their programs, thus reducing the time available for conducting information transfer programs.

2. Federal Funding

Through the period from 1984-1989, the NOSG contributions to SGMAS have increased by only 2 percent, while matching funds have increased 27 percent. In FY89, total funding of SGMAS was $9,198,314 in federal Sea Grant dollars and $8,027,654 in matching funds. The relative decrease in Sea Grant funds is consistent with the federalism policies of the 1980s and reflects level funding of the entire Sea Grant program during this period. The reduction in buying power has forced SGMAS personnel to supplement base funding by competing for additional grants and outside funding support.

3. Outside Funding Reliance

There is a growing trend in SGMAS to seek funds from a variety of sources. SGMAS programs are being forced to rely heavily on non-Sea Grant funding to maintain staffing at critical levels. Most programs are doing an excellent job of securing additional, non-Sea Grant funds, although an increasing reliance on outside funding sources may change SGMAS program direction, loyalties and identification. SGMAS personnel resources are already stretched thin, and consequently, many funding and program opportunities are being missed because staff are totally committed to other projects. At the same time, programs are reluctant to increase staff based on "soft money" support. These same staff are spending more time seeking funds or overseeing grants and contacts rather than conducting on-the-waterfront education programs.

4. Maturation of Staff

Throughout the SGMAS network, staff members have many years of experience. The trend indicates little turnover of personnel, and thus the major budget expense in SGMAS programs is dedicated to personnel salaries. On the positive side, a program with mature staff needs less time devoted to new staff training. An experienced staff, tuned in to the needs of targeted audiences, should be able to readily identify problems that merit outreach attention and quickly respond to clients. On the other hand, veteran staff members may require added stimulation and motivation to continue to excel in their outreach efforts. Finally, the need to retrain or retool is essential for a mature staff to keep abreast of changing technologies and remain flexible in their SGMAS roles.

5. Networking/Talent Sharing

Five regional Sea Grant Marine Advisory Service networks currently exist to identity problems of regional concern, share talent, conduct regional outreach programs and offer training opportunities for SGMAS personnel. However, the networking concept is not working as well as it has in the past. There are a number of constraints (distance, financial, institutional and personnel) that often prevent regional networking from operating effectively. A diminished regional effectiveness may be adversely affecting clientele services.

6. Innovative Staffing

Another evolving trend within SGMAS is to seek innovative mechanisms for talent sharing or identify part-time personnel to

Continued

conduct outreach efforts. This may take many different forms such as *contracting for* services of individuals for specific projects, buying *time* of researchers or other university personnel or soliciting *volunteers* to perform advisory service tasks. By utilizing these mechanisms, additional services and expertise can be provided to marine constituents without expanding the core of full-time SGMAS professionals.

SGMAS IN THE YEAR 2000

After examining present trends and the current state of the SGMAS network, the committee developed the following considerations for the future. The purpose of this section is to present ideas that will stimulate discussion and action by the Sea Grant community in order to help SGMAS meet the educational challenges of the 21st century.

A. EDUCATIONAL PROGRAMS

1. Program Flexibility and Innovative Staffing

a. Situation

Changing clientele groups, an emerging global economy, space-age communications and information technology, and a variety of funding alternatives are challenging our programs in ways we never imagined. Increased program activity in the form of grants and contracts and a decrease in ongoing, permanent funding are reshaping SGMAS staffs. New program initiatives are increasingly requiring higher degrees of specialization and enhanced staff skills. Extension involvement in applied research has also increased dramatically.

SGMAS's ability to respond in a programmatically effective and issues-oriented way in an environment of rapid change will be directly proportional to its level of flexibility: flexibility of existing core staff in effort redirection, administrative flexibility and creativity in developing hiring mechanisms for employing new staff within directed initiatives, flexibility and understanding by NOSG to allow for dynamic management of MAS staff and flexibility in implementing a dynamic policy framework for ongoing change in both programs and staffing.

b. Considerations for the Future

- Programs should acquire a heightened capability in contracting for specialized professional services (full- and part-time).

Sea Grant agent Bob Hines works one-on-one with a Marshallberg commercial fisherman to improve the efficiency of his gear. (Photo courtesy of North Carolina Sea Grant.)

. Programs should expand the utilization of volunteers for the delivery of some educational programs.

. SGMAS should significantly increase talent sharing of staff on a regional, national and potentially international scale.

. Sabbatical leaves and exchange programs of varying lengths should be encouraged to provide new skills and training that will enable staff to remain current in their field and/or retool to develop new programs.

. Innovative staffing should include new approaches to achieve increased extension-research interaction. In the future, SGMAS specialists will most likely have greater applied research responsibilities, while research scientists will have greater extension responsibilities.

. As appropriate, SGMAS should pursue increased utilization of industry expertise in programming, particularly in non-proprietary areas. Core staff should be encouraged and supported to take risks necessary to move aggressively into cutting-edge initiatives.

Continued

. The regional networking infrastructure should be examined to determine if improvements can be made to strengthen SGMAS programmatic capabilities and efficiency.

2. Innovative Communications and Information Technology

a. Situation

The information-based society of the 21st century will use an ever-increasing array of telecommunications and computer technology. SGMAS must monitor the rapid changes in electronic technology and the potential for these changes to increase the effectiveness of SGMAS's information delivery, educational programming, problem solving and management systems.

SGMAS has a major strategic resource for the 21st century: knowledge and the educational mission and capability to apply this knowledge to marine problems. As more information and information sources become available via new electronic technologies, people will need help to sort and evaluate them. The challenge will be to develop the right mechanisms and to present accurate information to the clientele who have the capability and power to solve tomorrow's marine resource problems.

b. Considerations for the Future

. *SGMAS* should allocate a portion of its budget to the acquisition and upgrading of new electronic equipment in order to remain on the cutting edge of this emerging technology.

. SGMAS should provide training for existing staff so they can utilize various electronic technologies in their educational programs.

. SGMAS should either add or utilize existing university specialists trained in the use of advanced electronic technology. The NOSG should provide national leadership and training in the application of these new electronic technologies.

. As information data base systems continue to be developed and expanded, SGMAS staff should devote time to identifying and developing inventories of these informational sources in order to have the most current information available to the marine community.

. SGMAS must not limit educational programs to the information-rich. The network should also be sensitive to the information-poor, who may have difficulty in accessing information because they cannot afford expensive technological systems.

3. Changing Industry Relationships

a. Situation

Sophisticated technology, a global economy and the information explosion are changing traditional relationships with industry associations and trade organizations in the private sector. Program activities are less frequently conducted one-on-one, and the traditional agent-client relationship has changed. To stay abreast of changes and opportunities with marine industry clientele, we will need to enhance our relationship with important trade associations and organizations.

b. Considerations for the Future

- *SGMAS* should identify those industry sectors considered clientele and establish mechanisms to improve information exchange with their leadership at the national level.
- Where applicable, SGMAS should use a program model that is more dependent on research-based specialists (for example, biotechnologists) to better address industry needs.
- Members of the National Sea Grant Review Panel with ties to industry should increase their role in nurturing the relationship between SGMAS and the private sector.
- As credibility and trust are developed with industry clientele, SGMAS should coordinate efforts to solicit funding from industry sources for identified projects.
- Local advisory committees must be well-rounded and include representatives from industry to prevent programs from stagnating and provide insight into changing industry needs and potential new clientele.

B. ADMINISTRATION

1. University Relations

a. Situation

SGMAS programs are usually integrated within the overall university structure. However, many programs are often not part of the important decision-making processes and are considered peripheral programs. This situation does not lend to the fostering of strong campuswide relationships and interactions. Consequently, professional advancement and established career ladders for SGMAS staff are frequently nonexistent or not clearly

Continued

defined. Funding sources may determine the type and extent of professional advancement opportunities because some universities are reluctant to tenure or make available multiyear contracts. for "soft money" positions.

b. Considerations for the Future

- Sea Grant administrators should actively encourage university administrators to clearly identify outreach education as an integral component of the university.

- Administrative and programmatic decision-making processes for SGMAS and marine extension should be integrated within university processes at a sufficient level to be instrumental in setting policies, budgets and programmatic initiatives.

- Agents and specialists should have clearly defined professional advancement opportunities within the established personnel policies of the university.

- Staff holding advanced degrees should have the opportunity to obtain departmental affiliation and tenure or multiyear contracts.

2. Funding Approaches

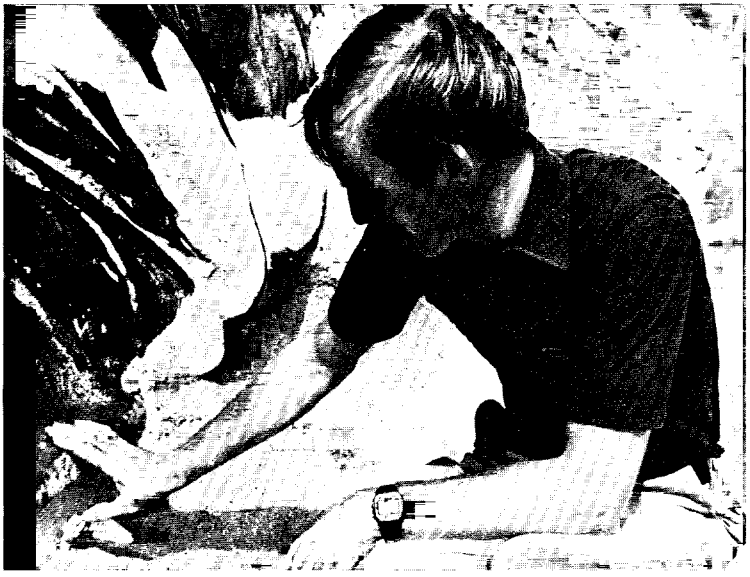
a. *Situation*

The buying power of NOSG contributions to SGMAS has declined significantly over the past decade. Correspondingly, SGMAS programs have augmented their efforts to obtain external funds from a variety of sources, including grants and contracts from other federal agencies, additional state and university support, investments by county governments and operational costs-recovery from user fees.

The partnership between Sea Grant and state, federal and private entities is undergoing important changes, and Sea Grant must increasingly share ownership of the program with other entities. The acknowledged success of SGMAS programs has presented new opportunities to leverage additional support from public and private sources, provided that SGMAS takes the initiative.

b. Considerations for the Future

- *NOSG* should expand funding opportunities for SGMAS by integrating the needs of other National Oceanic and Atmospheric Administration (NOAA) components. This effort should not be limited to NOAA, but should also include other appropriate federal agencies, which may not have been traditional Sea Grant cooperators.



Sea Grant coastal engineer Spencer Rogers examines an erosion control method used to protect construction in coastal hazard zones. (Photo courtesy of North Carolina Sea Grant.)

• SGMAS should actively seek additional state funding by special initiatives linked to identified needs of state government. As SGMAS expertise advances, it may be timely to foster a stronger partnership with state and local governments.

• SGMAS should continue to explore the opportunities to expand client-based funding support through the recovery of user fees and cooperative agreements.

• SGMAS should seek additional support from patent universities to reduce operational costs by paying true overhead costs and to increase availability of facilities, equipment and salary support.

• Funding opportunities should only be pursued if they are consistent with the national and state program goals.

3. The Role of SGMAS in Applied Research

a. *Situation*

During the past decade, trends in Sea Grant research have significantly reduced support for projects having immediate and direct application to SGMAS programming. Instead, more

Continued

generalized projects with longer-term payoffs have been emphasized. This trend has left some applied research needs untilled, while increasing applied research conducted or actively facilitated by SGMAS personnel. However, there exists no system-wide policy, funding mechanism, review or evaluation process to monitor the research activities of SGMAS personnel.

b. Considerations for the Future

- The Sea Grant network, including the NOSG, should formally acknowledge the need for and value of research conducted by SGMAS personnel and incorporate this function into the mission statement, programmatic accounting and review procedures.

- The NOSG should create new guidelines for reviewing proposals and evaluating SGMAS applied research projects to maintain high standards of quality, while allowing a rapid response to information needs.

- The NOSG should provide a pool of funds for applied (quick turnaround, immediate application) research in order to stimulate such work and to minimize competition between applied and less-applied, cutting-edge research within the Sea Grant system.

- SGMAS personnel should be encouraged to seek non-Sea Grant funds for the conduct of applied research.

- Individual programs should incorporate research activities into position descriptions to develop a cadre of personnel with background and interest in applied research as well as in outreach and education. Also, build it into Sea Grant research proposals.

C. EXPANDING HORIZONS

1. Developing an International Advisory Service Component

a Situation

Section 3 of the National Sea Grant College Program Act (P.L. 94-461) established the Sea Grant International Program to 1) enhance the research and development capabilities of developing foreign nations with respect to ocean and coastal resources, 2) promote the international exchange of information and data with respect to the assessment, development, use and conservation of such resources. Since 1976, global issues as they affect the U.S. economy have grown in importance. Concerns about global climate change have led to dramatic budget increases for global climate research. With the emergence of strong Asian and

European Common Market economies, the United States finds its economic system increasingly integrated into the global economy. As evidenced by the routine and growing trade imbalances, the United States has more work to do in order to be more competitive in this arena.

Traditionally, the American idea of technology transfer was perceived as the amount of American technology and information we could extend to the international community. As we enter the 21st century, foreign competitors have a competitive advantage in marine technology. The Japanese have exemplary seafood utilization and quality maintenance programs. The Dutch have been effectively holding back the sea since the 1600s. The Chinese have conducted aquaculture for over 2,000 years. Certainly there is new technology and information we can obtain from their experiences. In order to make the U.S. economy more competitive, we must make sure we extend this foreign information to our marine industries. If the SGMAS is to play a technology transfer role in this arena, it must become more informed about foreign languages, cultures, and economic and administrative systems.

b. Considerations for the Future

- As staffing opportunities arise, administrators should consider hiring staff with an eye toward developing international capabilities, to work in areas where both the host program and international partner will benefit.

- Administrators should encourage the development of international capabilities for existing staff through continuing education opportunities, faculty-business exchanges, interagency transfers and extension faculty leave policies.

- Sea Grant and extension administrators should develop a policy of encouragement of international technology transfer both within their own organizations and with state and county agencies or political units that fund the program.

- The NOSG should designate the SGMAS program director to seek new sources of funding for international work.

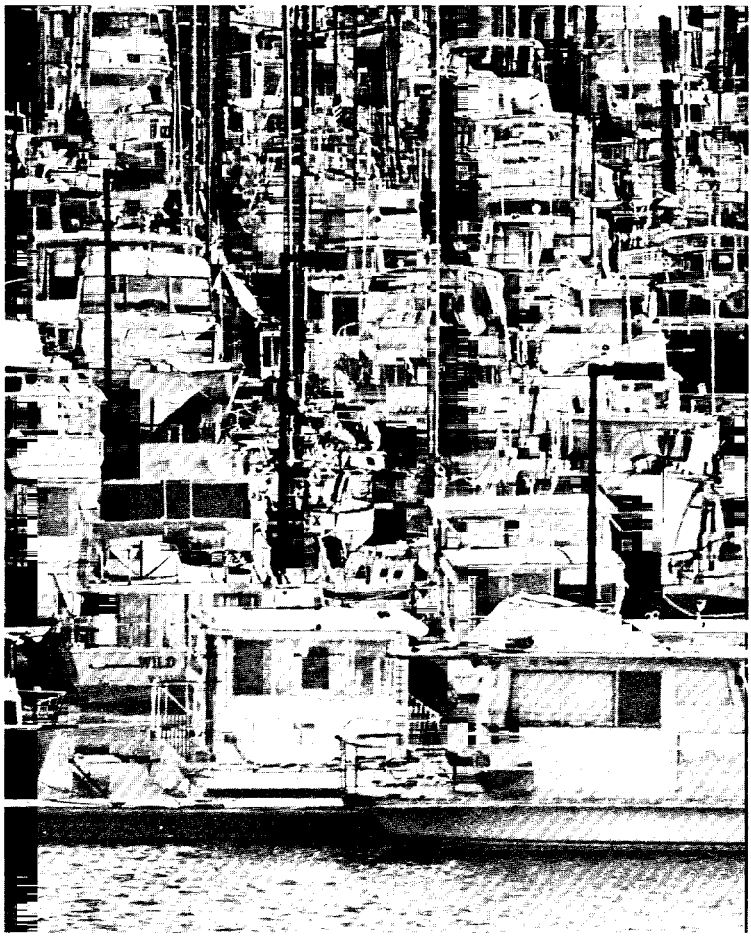
- Training programs to initiate international programming should be organized and developed by NOSG.

- In order to encourage and reward innovative programs in foreign exchange, a SGMAS competitive scholarship fund should be developed using existing award mechanisms established by the Sea Grant Association.

Continued

• National SGMAS evaluation guidelines should be adjusted to encourage organizational rewards for successful international SGMAS programs.

• Sea Grant should look for opportunities to extend the SGMAS model to other countries.



Water quality research and education are Sea Grant initiatives as demands on coastal resources increase. (Photo courtesy of Maryland Sea Grant.)

- **To document the ongoing status of activities and accomplishments, an inventory of international SGMAS projects should be assembled and included in the international projects data base of Sea Grant institutions established at Woods Hole Oceanographic Institute.**

- **A task force should be appointed by the Council of Sea Grant Directors and NOSG to organize and develop an international SGMAS component.**

2. Talent Exchange

a. Situation

SGMAS faces an increasing diversity of complex program issues that cannot be adequately addressed by staff in each individual state. Talent sharing among programs is desirable, especially for the less well-represented disciplines within the SGMAS network.

b. Considerations for the Future

- **The NOSG should develop a programmatically detailed directory and/or computer-based system of SGMAS staff who would be willing to participate in talent exchanges.**

- **Sea Grant directors and SGMAS program leaders should encourage sabbaticals and exchanges among their programs as a routine solution to meeting transitory program needs.**

- **The NOSG should develop a formal mechanism to stimulate interest and share costs for worthy exchanges.**

- **SGMAS program leaders must recognize and encourage the exploitation of research information outside of Sea Grant for the benefit of Sea Grant-focused clientele.**

SUMMARY

The SGMAS stands ready to accept the challenges and demands of the 21st century. We are capable of adapting to changes and willing to broaden our responsibilities to accommodate and respond to societal changes. The committee hopes this report leads to constructive dialogue and action as we head into a future with exciting challenges and potential for progress in developing and managing our marine and Great Lakes resources.

SEA GRANT

WORKING COMMITTEE

James Murray, Chairman
MAS Leader
North Carolina Sea Grant Program
North Carolina State University
Box 8605
Raleigh, North Carolina
27695-8605

Norman Bender,
Chairman 1990
MAS Leader
Connecticut Sea Grant Program
University of Connecticut
Avery Point
Groton, Connecticut 06340

Kathleen Lignell, Editor
Communications Coordinator
Maine/New Hampshire
Sea Grant Program
University of Maine
30 Coburn Hall
Orono, Maine 04469

William Cochrane
National Sea Grant College
Program Review Panel
ALCOA South Carolina, Inc.
211 Charles Street
Beaufort, South Carolina 29902

David Dow
MAS Leader
Maine/New Hampshire
Sea Grant Program
University of Maine
30 Coburn Hall
Orono, Maine 04469

William DuPaul
MAS Leader
Virginia Sea Grant Program
Virginia Institute
of Marine Science
Gloucester Point, Virginia 23062

James Falk
MAS Leader
Delaware Sea Grant Program
University of Delaware
Lewes, Delaware 19958

Bernard Griswold
Acting Division Director
NOAA/Sea Grant
R/OR SSMB-1, Fifth Floor
Silver Spring, Maryland 20910

Robert Malouf
Sea Grant Director
Oregon Sea Grant Program
AdS A5OOG
Oregon State University
Corvallis, Oregon 97331-2131

Joseph O'Leary
MAS Leader
Illinois-Indiana Sea Grant Program
Purdue University
Forestry Building
West Lafayette, Indiana 47907

John Schwartz
MAS Leader
Michigan Sea Grant Program
Michigan State University
334 Natural Resources Building
East Lansing, Michigan
48824-1222

Michael Spranger
MAS Leader
Washington Sea Grant Program
University of Washington
3716 Brooklyn Avenue, N.E.
Seattle, Washington 98105