New York Sea Grant

Strategic Planning Draft Document

I. INTRODUCTION

New York Sea Grant's **Strategic Planning Document** has two major purposes: to present its **Vision, Mission**, and **Goals** and to explain how and why New York Sea Grant developed this plan.

Section II below presents New York Sea Grant's **Vision** and **Mission** statements--where NYSG is going in the long term (toward wise coastal resource management) and how it will get there (by providing sound objective science information to decision makers). Two aspects of the Vision and Mission are responsible for the uniqueness of NYSG's role in coastal resource issues. First, NYSG's Vision and Mission are aimed at the use – the sustainable use --and protection of coastal resources. This dichotomy of focus is responsible for the balanced, non-advocacy approach that NYSG takes in developing and presenting objective science-based information to decision-makers. Second, NYSG provides information to decision-makers, but avoids participating directly in making the decisions. New York Sea Grant tries to make sure that the most up-to-date and sound information is incorporated into the considerations or negotiations leading up to a decision, policy, or regulation. New York Sea Grant has reached its ultimate goal when all sides of a resource question use the same NYSG-provided information. It is this focus on both sides of resource allocation decisions and allegiance to objectivity that differentiates NYSG from organizations such as New York State Department of Environmental Conservation (NYSDEC), whose goal is environmental protection, and Empire State Development, whose goal is development of resources.

New York's diverse and widely distributed water resources dictate a complexity to the program both organizationally and programmatically as described in Section III. Trends in coastal uses, human and biotic demographics, climate, technologies and management strategies must also be taken into account to anticipate and focus on society's most important coastal resource problems and opportunities. Section IV calls attention to the fact that NYSG exists within both state and Federal structures that establish limits on its scope and actions as well as responsibilities for its programs. The existing structure, organization and staff of New York Sea Grant were implicitly recognized during the development of this plan. Thus, although the plan presented here is very

different from the previous plan, it was not created entirely *de novo*. It is built on and modified from what was already in existence. The existing program was already doing good work.

The **Goals** and **Objectives** presented in Section V form the body of the Strategic Plan. These are the specific technical steps that will be taken in the next four to six years to fulfill the New York Sea Grant Mission and provide the basis for the Implementation Plan (not included here) that will be carried out over the next two years. Most of the statewide and national trends mentioned in Section III are reflected in the technical Goals and Objectives.

Section VI documents three roles that are important for ensuring that NYSG can accomplish its Mission and achieve its Vision. These roles include maintaining and increasing New York Sea Grant's

- Reputation for objectivity in research, extension and education
- Place as a liaison between the parties involved in resource decision-making
- Assistance in identifying, defining and evaluating alternative options in resource allocation decision- or policy-making.

The ways that NYSG goes about reinforcing those roles is also discussed.

Section VII summarizes the steps that NYSG took in developing this document. Its major point is that staff, managers, advisory groups, the Board of Governors, researchers, stakeholders and the NSGCP all participated. The last two Sections VIII (Moving into the Future) and IX (The Next Steps) discuss NYSG in the future. The former provides the rationale for a number of **Action Items** that will help NYSG improve. The latter references the **Implementation Plan**. This Implementation Plan in odd numbered years with the Biennial Omnibus Proposal that NYSG submitted to the NSGCP. It is much too long to distribute generally. A summary version is being contemplated for preparation sometime in the fall of 2000.

With all its supporting information, this document is rather long. A much shorter version of the Strategic Plan has been prepared for general distribution. However, this long version will be useful for the NYSG staff, advisory committees and Board of Governors, the National Sea Grant College Office, and any outside reviewers as a resource document. It also will be helpful for future reconsideration of the plan itself.

The management and staff of New York Sea Grant hope that this brief roadmap will help increase the readability and understanding of this document. We are committed to the philosophy of the Sea Grant program, the details of the plan included here and to making the coastal areas of New York State and the nation better places to live, work and recreate.

Throughout the Strategic Plan, New York Sea Grant uses the terms:

Coastal to mean both marine (New York Harbor, Long Island including bays and inlets and Long Island Sound) and freshwater (Lakes Erie and Ontario, Hudson Estuary to the Troy Dam, Niagara and St. Lawrence Rivers and Lake Champlain) areas.

Seafood to mean edible freshwater and marine fish, shellfish and aquatic plants.

II. New York Sea Grant's VISION AND MISSION

VISION

NYSG is a leader in providing science-based information for coastal decision-making and a collaborative force for wise management, economic development and conservation of New York's and the Nation's coastal assets.

This vision recognizes the frameworks established by NOAA's and the National Sea Grant Program's strategic plans, but is somewhat more focused on the role of collaborator or supporter of individuals and organizations with decision making roles within NYS and the Nation. NYSG is small in terms of the numbers of people and economic resources compared to many of the resource management organizations with which it collaborates. However, NYSG already has a reputation as a generator (via research) and purveyor (via outreach) of objective science-based information. By continuing these roles, and actively educating other organizations with coastal interests or responsibilities in the State about NYSG's value as an unbiased participant in the process (but not actively in the decision making), NYSG's impact will be multiplied many times beyond its economic assets.

MISSION

To identify, support and extend research-based information, which enables individuals, communities, businesses and decision makers to better conserve, utilize and rehabilitate their coastal resources.

NYSG's slogan, "Bringing Science To The Shore," is a sound expression of the overall role envisioned for the NYSG program. Sea Grant state programs, including NYSG, are unique in having the seemingly competing objectives of developing coastal resources, while protecting and preserving them for future generations. The best way to support this sustained development of valuable coastal resources appears to depend on making the best science available to all the stakeholders in resource management decisions as they deliberate toward decisions that reflect society's best interests.

VALUES

How NYSG achieves its vision and mission is highly dependent on the values that it espouses as an organization. NYSG's activities are based on four values: 1) development and extension of high quality science; 2) objective research and transfer of information; 3) applicability of science to improve coastal management decisions; and 4) stakeholder collaboration to maximize program applicability and usefulness. In short, badly conceived or conducted science cannot contribute to answering any questions or solving any problems, even the most trite or simple. Information that is developed or presented with bias is polemical and cannot be trusted. Advocates cannot be

viewed without skepticism either. But objective science can contribute to wise decisions about coastal resources. And, finally, input from stakeholders on all sides of the resource decision can help to make sure that any search for information, whether by primary research or summarization of existing science, will be oriented toward the important questions that need to be resolved. These values set the stage for the roles that NYSG must play in optimizing resource management decision-making for New York State and the nation.

In order to achieve the chosen mission, NYSG managers and staff work toward achieving roles for NYSG in the decision-making protocols. In the short-term, NYSG must gain acceptance by decision-makers of several roles for the organization in supporting resource management decisions. We want decision-makers to agree that 1) NYSG-developed scientific information is objective and unbiased, 2) NYSG contributes value as a liaison among the other stakeholders, and 3) NYSG Extension specialists and research managers fairly summarize and integrate available information. NYSG will also need to work toward satisfying long-term needs for educating citizens and future decision-makers and integrating the extension, education and research components of the NYSG program to optimize the applicability of scientific information toward future problems and opportunities in coastal resource management. The operational approaches that NYSG has chosen for these ends are discussed briefly below following discussion of the technical goals and objectives that NYSG has chosen to include in the strategic plan.

III. NEW YORK'S WATER RESOURCES AND SITUATION

WATER RESOURCES

New York, with 3,400 miles of widely varied coastline, is the only state in the country bordering two Great Lakes and the ocean. Exceptional coastal water bodies including the Hudson, St. Lawrence, and Niagara Rivers, Lakes Ontario, Erie and Champlain, Long Island Sound and inland bays, New York Harbor and the Atlantic Ocean have provided New York with natural economic and social advantages. Reflective of the trend for the nation's population to be drawn to coastal areas, today more than 85 percent of New York's population – 18.2 million people -- live along its coastlines. Such inhabitance and use has put enormous pressures on these areas and their natural resources. New York Sea Grant (NYSG) was created in 1971 (it became a Sea Grant College in January 1975) to help provide science-based information useful for the wise management, use, protection, and development of these treasures. *See the map on page 1*.

The diversity of NYSG's responsibilities is at once a challenge and opportunity. This diversity is signaled by NYSG's membership in three regional Sea Grant networks, the Northeast, the Great Lakes and the Mid-Atlantic. In addition, water resource management in the marine district involves multi-state or regional negotiation and agreement. New York and New Jersey make many decisions about resources in and near the lower Hudson River through the NY-NJ Port Authority

and the USEPA's National Estuary Program. The Atlantic States Marine Fisheries Commission, however, can set fishing mortality rates, for anadromous fish such as striped bass, that apply throughout New York's marine district including the port and the Hudson River to its tidal limits. Technically, this could extend 153 river miles to the Troy dam. Finally, via activities of the USEPA-sponsored Long Island Sound Study (LISS) and the 1999-2000 Long Island Sound Lobster die-off, New York and Connecticut have been drawn into more formal relationships for allocating responsibilities for preventing and mitigating water quality impacts on LIS.

Complexities in the management of Long Island Sound and the NYS marine district offer opportunities for effective collaboration. New York City, because of its huge population and extensive resources has a system of agency support that parallels that for the whole state. Thus, decisions frequently require negotiation of authority/responsibility as well as what appears best for use and protection of the resource. However, the duality of agency responsibilities for the same resources, means a doubling of the human resources that are available to development information for and participate in management decisions. In the Great Lakes, the situation is even more complex. Lakes Erie and Ontario receive the united attention of the NYS Coalition of Great Lakes' Legislators. The Sea Grant Great Lakes network examines the similarities and differences of all five lakes largely from a US perspective. Finally, several international commissions indicate recognition of the need to involve stakeholders on both sides of the lakes and in the watershed to make wise use of the resources. This brings Canadian Federal and provincial governments, agencies, and stakeholders into the process. Other informal groups along the water bodies (Lake Erie at the Millennium, the binational working group) including the Saint Lawrence River plan research together to provide the wherewithal for wise policy making. Again, the overlap of management responsibilities provides resources to be tapped for decision-making.

New York's candidate coastal water bodies run the gamut from marine through estuarine to fresh water. Thus, the coastal issues and their impacts on the local economy vary widely due to concentrations of populations and the differences that they make in potential for coastal use and the competition with other economic contributors. NYSG deals with a multitude of issues over a quite broad geographic range. Because of this, decisions about focus and effort take on a bigger role in planning lest the activities be so diffuse as to make little impact anywhere in the state. In addition, leveraging of effort and co-funding with other entities within the state and region(s) is a necessity rather than a luxury. NYSG is active in developing and participating in these collaborations.

For more than 25 years, NYSG has conducted a multi-faceted program for all these resources. A strong program of academic research has been supported on issues related to the understanding and use of coastal resources. An experienced team of Extension specialists has been developed with broad local, regional, and national networks positioned to provide technical expertise to managers, coastal user groups and the public. Educational programs have been designed to teach graduate students so they can provide the next generation of coastal scientists as well as primary and secondary students to foster a science-aware citizenry. These activities have been conducted formally at schools as well as informally with youth groups and clubs. Finally, numerous

communication projects have been initiated to disseminate information on coastal issues to the widest audience possible. In short, NYSG is an issue-based partnership program for citizens, interest groups, governments, businesses, industries and universities that deals with problems and opportunities. New York Sea Grant's efforts have facilitated sound decision-making, by and for, the wide variety of stakeholders who manage, use, and enjoy New York's coastal resources.

Resource Issue Trends

New York's coastal resources and their uses have not been static and are not expected to remain so in the future. Therefore, New York Sea Grant's program of outreach, education and research must be broad and flexible. It must respond to changes and trends in human and ecological demographics, in technologies that can potentially influence coastal zone management, and in management strategies and needs for, or communication of, scientific information. Generic changes or trends that apply to the country as a whole or to the regions surrounding New York State, as well as those which are specific to one or more coastal zones in New York State, all determine the problems important for NYSG to consider.

Many of the generic trends have been discussed in a recent National Ocean Service report (Bookman, et al. 1999). Human population growth, which is particularly rapid in coastal areas, causes coastal urbanization with all of its implications for pressures on water quantity and quality and specialty habitats, such as wetlands. All three of these concerns, particularly contaminant and fish residues and habitat degradation, have been found in a NYS Department of Environmental Conservation survey to be primary citizen concerns in NYS (Connelly, et al. 1998). Generic pressures include increased competition for resources by coastal dependent businesses, which often are relatively small and therefore vulnerable to small changes in their economics. These businesses need help if they are to continue to contribute to the NYS economy. Increasing speed and globalization of transportation is at least one major cause of the increasing distribution of biotic species to areas where they are not indigenous. When these species 'catch hold', they often cause structural and/or functional changes in ecosystems. These changes also present problems to coastal facilities that they were not designed to handle. Global climate has been warming, which could increase vulnerability of shorelines to erosion and flooding. Full exploitation of many commercially and/or recreationally harvested species and the need for community or ecosystem, as against population, management has led to an increasing focus on essential habitat as a management tool and to aquaculture as a tool to supplement wild harvests by raising food directly. Aquaculture also may contribute significantly to maintaining or sustaining aquatic populations, although whether this is a wise strategy given the potential for reducing the variability of the gene pool is controversial. Never-the-less, it is clear that sustaining harvestable populations requires general maintenance of healthy populations and ecosystems. Genetics is also prominent in searches for and development of products and processes from coastal biota via advances in biotechnology. Finally, the safety of freshwater fish and seafood is receiving increasing scrutiny.

Trends specific to New York State are no less important. New York State already has 17 percent and 16 percent, respectively, of the seasonal housing in the Northeast and Great Lakes regions, yet coastal property is increasingly viewed as desirable. Perhaps a major share of the growth can take place in the Hudson River Valley, where efforts are underway to develop uses of old waterfront infrastructure to attract tourism. Handling of the persistent sediment contamination and fish residue issues may influence how well this proceeds. Tourism also might be a savior for the Great Lakes region, where economic recovery, from the early 1990's recession, is at best lagging badly behind that in much of the rest of the state. But there are changes in the ecosystem dynamics of Lakes Erie and Ontario, some of which seem to be having deleterious effects on the world class fisheries; these will require positive treatments to increase the tourist base. Other trends that are causing increased controversy near the coasts are waterfront redevelopment, watershed development, and boat use. Conflict resolution related to jet ski use is on the rise, but this is just one example of increasing resource use conflicts. Issues related to both point and non-point source pollution and their effects on environmental resources drive efforts directed at the Peconic Bay and the South Shore Estuary.

IV. New York Sea Grant's RESOURCES TO ACHIEVE SUCCESS

NYSG has an organizational structure and a background of federal and state support that gives it a unique basis for interacting with policy and decision makers to support coastal protection and wise development of coastal resources in New York State and the nation.

New York Sea Grant Structure

The structure of NYSG (Figure 2) reflects its sponsorship in New York State by both Cornell University and the State University of New York (with its 30 plus university and college campuses) and the geographic, physical, chemical and biotic diversity of its aquatic resources. This section briefly summarizes aspects of the two sponsoring institutions, the Board of Governors, three different types of advisory committees, and the organization and location of the management and staff of NYSG that influence NYSG's success.

NYSG is sponsored by both the State University of New York and Cornell University. These are two of the largest and most prestigious institutions of higher learning in New York State (NYS), and both have national and international reputations. Both institutions have charters that include providing service according to the needs of the state. Cornell, as a Land Grant College, has a long history of support of agricultural extension via the Cornell Cooperative Extension program. NYSG Extension thus benefits from the academic and other support experience that Cornell has gained in maintaining and sustaining geographically spread Extension services within a traditional academic institution. Although not in the immediate vicinity of the Great Lakes District, Cornell gives NYSG a strong administrative upstate presence, but also has links to marine district via county cooperative

projects and the experimental laboratory in Riverhead, LI, NY. SUNY has a broad state-wide presence because of the geographic ubiquity of its campuses from eastern Long Island to Buffalo. It also has a central presence at the seat of NYS government and a directly state-supportive mission. Two of its main campuses, including the Universities at Buffalo and Stony Brook, are situated at prime locations in the Great Lakes and marine districts, respectively. The main administrative offices of NYSG are housed at USB. The combination of upstate and downstate locations of Cornell and SUNY gives NYSG the ability to respond to the unique responsibility of a bimodal focus.

The Board of Governors (BOG) preserves NYSG's continuity and establishes its policies (See list below). It is made up of senior academic officials from Cornell University and the State University of New York, as well as one lay member appointed by each. Representatives of the Commissioners of the State Departments of Environmental Conservation and Economic Development are *ex officio* members. Within the BOG, therefore, is intimate and expert knowledge of and experience with the academic community, as well as with the more pragmatic regulatory and economic development agencies, and business communities. This gives NYSG the balance to focus all of its elements on the sustainable development mission of the National Sea Grant College Program. The BOG also provides advice and approval of strategic plans, of yearly funding allocation plans, and of other operational policies that affect how NYSG conducts it mission.

New York Sea Grant Board of Governors 2000

Dr. Kraig Adler, *Vice Chair of the Board of Governors*
Vice Provost for Life Sciences, Cornell University

Dr. D. Merrill Ewert, Director
Cornell Cooperative Extension, Cornell University

Dr. Marvin Geller, *Chair of the Board of Governors*
Dean and Director of the Marine Sciences Research Center, The University at Stony Brook

Dr. Susan A. Henry, The Ronald P. Lynch Dean
College of Agriculture and Life Sciences Cornell University

Dr. Theodore L. Hullar, Director and Professor
Center for the Environment, Cornell University

Dr. James Lassoie, Chair
Department of Natural Resources, Cornell University

Dr. R. Wayne Diesel, Vice Chancellor for Business and Industry Relations
State University of New York

Dr. Jack Y. Narayan, Interim Dean of Graduate Studies & Research
SUNY College at Oswego

Dr. H. Lorraine Oak, Associate Dean for Interdisciplinary Affairs
SUNY at Buffalo

Mr. Francis Pordum
Cornell Lay Member Representative

Dr. William Tully, Vice President for Academic Affairs
SUNY College of Environmental Science and Forestry

Appointment Pending
SUNY Lay Member Representative

Ex Officio Members:
Mr. Gordon Colvin, Director of Marine Resources
New York State Department of Environmental Conservation

Mr. Robert Crowder, Policy Analyst
Empire State Development

Structure also plays a role in the efficiency of staff within NYSG. NYSG Research management staff is located together in the administrative offices at the University at Stony Brook. Offices are at the Marine Sciences Research Center, the primary marine coastal research facility within the SUNY system. Locally available are the support services, such as libraries, to search for technical information, peer reviewers, and Technical Panel members. The address lends credibility to the research effort. Maintenance of close relationships with the University of Buffalo and other Great Lakes institutions provides technical support for the freshwater coastal research efforts. Having the research managers at a single location contributes to the success of the research program of NYSG. It allows staff to interact effectively and assist each other with technical topics and with management details and is a necessity for maintenance of administrative records. In contrast, the Extension staff are located at offices from one end of the state to the other. This alternative distribution is appropriate for the part of the organization that works closely with stakeholders. The NYSG associate director and Extension program leader is housed at Cornell to provide upstate leadership and to take advantage of the administrative support and experience offered by co-location with Cornell Cooperative Extension.

Both Extension specialists and research managers are recruited because of their technical expertise in:

- Aquaculture
- Aquatic Nuisance Species (Non-Indigenous Species)
- Coastal Facilities Design and Management

- Coastal Resource Management
- Coastal Processes & Erosion Control
- Community Issues
- Fisheries Biology and Management
- Marine and Great Lakes Education
- Seafood (safety, nutrition, and technology)
- Sustainable Development
- Tourism and Recreation Planning
- Water Quality and Habitat Restoration

The specialists earn the recognition, respect and acceptance of stakeholders through their effectiveness in serving them. This requires a healthy mix of knowledge and experience as well as the programmatic focus needed for providing real solutions for real (and important) problems. NYSG is fortunate to have a very experienced cadre of specialists**.** Time at NYSG for the current specialists ranges from 4 to 21 years; average years of experience in their specialties is 14. Extension specialists are expected to spend part of their time maintaining their technical expertise as well as conducting applied research related to their subject matter expertise. The desire for increasing the effectiveness of its educational efforts has led NYSG to concentrate its educational resources on teaching teachers and on sponsoring Sea Grant scholars on research projects. In the former case, coverage is multiplied by factors of 20 to hundreds, even in the course of a single year. The latter tack recruits graduate students to participate on NYSG projects as parts of their theses or dissertations. Many of these Sea Grant Scholars participate in providing the scientific knowledge and expertise for the next generation. They also will be part of a research community that is schooled in problem-based or industry-focused problem solving, a necessary resource for Sea Grant's future activities. NYSG research managers have applied research and research management experience to gain the confidence of academic researchers, agency staff, and industry representatives and help ensure that the academic research will be relevant to problems and opportunities throughout the state.

Finally, because of the typical geographic separation of the research and extension function of NYSG, special effort is required to call attention to the integration that will foster program effectiveness. NYSG has a central communications group to aid this process. Communications is part of the charter of Sea Grant programs. Communications can reinforce the integration that comes from planning together and call attention to similarities in efforts around the state. By preparing integrated or combined articles in the NYSG newsletter "*Coastlines*," communications can contribute psychologically and philosophically to keeping the program together. Integrative planning efforts are documented in the section below, "development of this Strategic Plan."

NYSG Relation to New York State

Beside being sponsored by Cornell and SUNY, NYSG is closely tied to the state in other ways. For every dollar of federal funds that are awarded by the National Sea Grant College Program (NSGCP), NYSG must provide $0.50 in non-federal matching funds. This is accomplished in part

by PIs on NYSG grants and Extension staff on outreach investments funded by the NSGCP providing match of salary and other funds. In addition, NYS provides state funds directly to NYSG via a funding line in the SUNY Central Office budget. These state funds also provide match that can cover the needs for administration and communications.

NYSG depends heavily on input from agencies, business and industry representatives and groups, environmental action groups, and academic researchers for planning, priority setting and selection of work to be accomplished. At the NYSG program level, the permanent Program Advisory Council (see list below), and other stakeholders, have provided comments and constructive criticisms of this and the previous (1995) strategic planning document and have helped to define scopes for research activities. PAC membership was recently increased by about 50 percent in order to include the primary organizations that deal with coastal issues in New York. The PAC is involved on a regular basis in selecting pre-proposals and full proposals for NYSG's biennial omnibus research program based on programmatic relevance for NYS. [Individual advisory committees for the Extension specialists also provide input to this solicitation - see below.] PAC members also have contributed to selection of topics of research for special solicitations. Selection of all research to be conducted also depends on peer reviews and summaries of those reviews by *ad hoc* Technical Review Panels. Scientific quality is the first level of screening for all proposals; if a proposal does not stand up to the rigor of scientific peer review, it is not considered for funding no matter how relevant it is to program goals.

New York Sea Grant Program Advisory Council

Mr. Robert Alpern
New York City Department of Environmental Protection

Mr. Gerald Barnhart
New York State Department of Environmental Conservation

Ms. Betsy Blair
New York State Department of Environmental Conservation

Dr. Frank Bohlen
Department of Marine Sciences, University of Connecticut

Mr. Jeffrey Clock
Central Hudson Gas & Electric Corp.

Dr. DeWitt Davies
Suffolk County Planning Department

Ms. Merryl Kafka
New York Aquarium

Mr. Paul Kostyniak
Toxicology Research Center, University of Buffalo

Mr. Anthony Kotz
The Ontario Dune Coalition, Kotz and Associates

Mr. Marc Matsil
New York City Parks and Recreation

Ms. Teresa Mitchell
Seaway Trail, Inc.
Ms. Aida Reyes-Kuehn
New York State Department of Economic Development

Mr. Ed Sander
Monroe County Fish Advisory Board

Mr. George Stafford
New York State Department of State

Dr. Dennis Suszkowski
Hudson River Foundation

Mr. Louie Tobias
New York State Legislative Commission on Science and Technology

Mr. Roger Tollefsen
New York Seafood Council

Mr. Larry Watts
New York State Charter Sportfishing Council

Peer reviewers are out-of-state experts who have published in the area of the proposal that they are asked to review. Technical Review Panels are made up of more experienced academic or government researchers chosen to span the range of topics of research that has been subject to peer review. These panels integrate peer reviews and allow cross-subject comparisons to help establish scientific priorities in preparation for evaluation of programmatic relevance by the PAC.

Stakeholder input is equally important for programming by the Extension specialists. Each specialist has a Program Advisory Network (PAN) to assist in guiding his/her Extension activities. These PANs also influence the biennial omnibus solicitation. Extension specialists are surveyed

for topical suggestions for the omnibus solicitation; many of these suggestions come directly from members of individual PANs.

NYSG is intimately involved in various programs around the state providing advice on design and implementation of plans related to many of the state's coastal resources. In the Marine district, NYSG management and staff participate in activities related to the NYS Department of State's (DOS) Long Island Sound Coastal Advisory Commission, the USEPA's Long Island Sound Study, the USEPA-sponsored Peconic Estuary Program, and the DOS South Shore Estuary Reserve studies. In the Hudson River, NYSG participates with the New York State Departiment of Environmental Conservation (DEC) on the National Estuary Research Reserve Fellowship program, including funding half of each year's fellowship, and with the DEC advisory committee for the Hudson River Management Plan. In the Great Lakes District, NYSG participates on the Board of the Great Lakes Research Consortium, as an integral part of the Great Lakes Program at the University of Buffalo, and on the Lake Champlain Sea Grant. NYSG benefits by obtaining research and extension leads for new work, and contributes by adding NYSG perspectives to the mix being considered in the study plans.

New York Sea Grant Relation to the Federal Government

NYSG is not alone, but part of a network. NYSG is one of 29 Sea Grant programs located in all of the Great Lakes and marine coastal states (and Puerto Rico). Each of these programs is a joint federal and non-federal collaboration loosely organized by the National Sea Grant College Program (NSGCP) which administers the allocation of the federal funds. Each of the programs submits a proposal for funds, including a 50 percent non-federal match, to the NSGCP. Currently, the NSGCP evaluates the state-wide researcher eligibility, stakeholder input, peer review processes, and programmatic decision rationales with respect to fairness and objectivity as criteria for deciding at what level to fund the state programs. However, each program selects the research proposals and outreach efforts that it will fund. Thus, there is substantial local input and responsibility for the research, extension and educational efforts conducted by each of the programs

Although the majority of NYSG's efforts are directed toward NYS problems, NYSG must also fit into the goals of the federal organizations of which it is a part. Located under the umbrellas of the NSGCP, the National Oceanographic and Atmospheric Administration (NOAA), and the Department of Commerce, NYSG supports the visions and missions of each of these parent organizations. As expressed in the 1995-2005 Strategic Plan, NOAA "envisions a 21st century in which environmental stewardship, assessment, and prediction serve as keystones to enhancing economic prosperity and quality of life, better protecting lives and property, and strengthening the U.S. balance of trade." NOAA's mission, then, is to describe and predict changes in the Earth's environment, and to conserve and manage wisely the nation's coastal and marine resources to ensure sustainable economic opportunities. In order to successfully complete the mission and achieve the vision, the NOAA Strategic Plan outlined seven required actions. These actions, which depend on a mix of research, extension, education and/or communication, define the scope

of the Environmental Stewardship component of NOAA's mission, i.e., to build sustainable fisheries, recover protected species and sustain healthy coasts. This scope lays the framework for the NSGCP strategic plan.

NSGCP's mission is to conduct research, education and outreach (extension and communication) to use and conserve coastal and marine resources for a sustainable economy and environment. The relationship of the NSGCP and NOAA missions is clear. NSGCP has identified three areas where it can have major impacts on progress during the decade covered by its 1995-2005 Strategic Plan. The NSGCP network will focus its research, education and outreach on achieving: 1) economic leadership by strengthening the economic position of the U.S. and fostering sustainable resource development via development of advanced technologies for commercial products and processes, seafood production, and coastal economic development; 2) coastal ecosystem health and public safety by restoring, enhancing and protecting coastal ecosystems, developing economically sound coastal communities, and improving the safety and security of coastal residents via development of a better understanding of the characteristics of healthy ecosystems and the effects of anthropogenic sources of change, the importance of habitat to biota and community structure and function, the relationship between sustainable development and socioeconomic well-being, the relationships between coastal development and damage due to weather phenomena, the basis for vessel stability, and the role of new materials and training in safe diving and sailing; and 3) a technically trained professional work force and scientifically and environmentally informed public by developing educational programs aimed at primary and secondary school pupils, college undergraduates, graduate students and adults to ensure decision making that will support sustainable development of coastal resources.

Achievement of these goals will help ensure the NSGCP vision of a U.S. preeminent in marine sciences and marine affairs, leading in marine industry and marine and coastal safety, and bearing the standard of sustainable use and conservation of marine and Great Lakes resources and environments.

NYSG has developed this strategic plan to be compatible with and supportive of the strategic plans for NOAA and the NSGCP that are summarized above and to guide and coordinate all components of its activities in order to maximize the potential benefits of the state's coastal resources and areas in the 21st century. The concepts and plans described herein are philosophically acceptable to NYSG's parent institutions of Cornell University and SUNY, the national Cooperative Extension System, and New York State. They have been developed and refined by NYSG management and staff, and have been reviewed by university investigators and administrators, state environmental and resource managers, and representatives from other coastal research funding organizations, business and industry associations, and environmental organizations. The plan has greatly benefited from their comments. This strategic plan is designed to provide a construct upon which to develop on-going operating plans and guide and focus continuing program development.

V. ISSUES AND GOALS
RATIONALES AND OBJECTIVES

Individual problems or opportunities require flexible application of the best mix of research, outreach and education expertise available through NYSG to optimize decision-making. Thus, the optimum allocation of efforts from the various components of NYSG require identification of technical goals. Such identification, including the economic or other important rationale for devoting NYSG effort, previous activities and their outcomes upon which the strategic plan for the issue is based, and the activities that are needed to solve the problem or take full advantage of the opportunity are presented here.

The Vision and Mission above set the stage for increasing NYSG contributions to sustainable development of coastal resources in NYS, the region and the nation. However, that contribution is dependent on work on the critical NYS (and other) topics. NYSG has had broad and complex iterative input from stakeholders in NYS coastal resources. These inputs have identified a large number of goals, but have also helped to select high priority ones for focus of NYSG attentions. We have chosen to divide these goals into the three categories or issues- Economic Leadership; Coastal Ecosystem Health and Public Safety; and Education and Human Resources following the lead of the NSGCP strategic plan. This will clearly show how the NYSG plan will contribute to goals of the NSGCP plan. In the presentations that follow, each topic discussion begins with a rationale for devoting effort toward achieving the Goal, then lists the strategic objectives of the work that designed to achieve it.

A. ECONOMIC LEADERSHIP ISSUES

GOAL 1. INCREASE THE COMPETITIVENESS OF COASTAL-DEPENDENT BUSINESSES:

A. Rationale

The changing structure of coastal businesses and industries offers opportunities for NYSG to contribute to the state's economy. The current service-centered (recreation, tourism, marina, etc.) emphasis now rivals the commercial trade, transportation, and resource product emphasis (manufacturing, commercial fishing, and seafood processing) that dominated coastal business activities for most of the eighteenth, nineteenth, and twentieth centuries. As more of the New York State population has moved toward the coasts, the service industry has developed to meet the needs of the coastal migrants and to respond to the desires of residents and visitors alike for access to coastal attractions. Currently, more than 80 percent of business expansion in coastal areas is in the service economy. These businesses have become critical to a healthy economy in New York State.

The service industry tends to be dominated by small businesses, which operate at very low profit margins in highly competitive environments. Thus, any efforts to support increased service industry contributions to New York's economy must come from outside of the industry itself. Small businesses in a highly competitive environment have little possibility and even less incentive to band together to promote common goods or to develop tools to handle generic problems that they face together. New York Sea Grant can support these businesses and industries so that they can yield increased benefits to New York's economy.

Public and private boating facilities, such as marinas and boatyards are an important part of the recreational tourism infrastructure and economy. Over 5.5 million New Yorkers participate in boating annually, a significant contribution to the state's economy. For example, the Long Island Sound Study found that recreational boating was the single most important economic activity associated with the use of Long Island Sound, generating some $3.2 billion in 1990 alone. To maintain and increase the contribution of boating to New York's economy, facility operators need technical and educational assistance to help them identify and implement business management and operations, pollution control measures and facilities management in a cost-effective manner. Government officials also need to be educated in the needs of the industry and the effectiveness and costs of various means to manage facilities. Environmentally benign methods for dredging and disposal of dredge spoils, even though they are minor contributors to the more general pollution problem, also are needed to maintain access to the facilities.

Tourism, including ecotourism and nature-based tourism, is playing a greater role in the economy of the state and the Great Lakes Region in particular. As sportfishing activities decline with the fisheries, chambers of commerce are looking for alternative marketing strategies to lure tourists and their dollars. Bird watching recently generated $219 million in the state in 1991. In general, tourism expansion has helped replace the loss of IBM as a major economic engine in the Hudson Valley; nearly 90,000 jobs there are supported by tourism. But with recreational use of the River increasing rapidly, it is becoming more important to understand the interrelationships of the various components of the ecosystem and to foster responsible use of the resource.

New types of tourism and tourism practices offer promise for increasing revenues while avoiding the potential environmental impacts that can follow. Increased clarity of Great Lake's waters has increased interest in shipwrecks and other underwater resources. Means to take advantage of these opportunities while preventing damage to the same resources is important for sustainability. Interpretation, signs or brochures, audio tapes or low power radio and videotapes describing resources and how to experience them have helped generate visits. They also have helped visitors avoid damaging the resources, e.g., sensitive plants, dune habitat, etc., while still enjoying them. In the small Salmon River corridor near Lake Ontario interpretive aids helped generate about $100,000 of expenditures in an area where these funds contribute significantly to the economy. Similar efforts focused through the internet could entice tourists to specific areas.

The seafood industry could gain from efforts to develop innovative marketing strategies. These strategies should aim to make consumers aware of the many positive nutritional benefits

associated with seafood consumption and proper ways to handle, store and prepare it to maximize safety and palatability. Objective information will help consumers make educated decisions about the practices that best meet their individual health and economic needs and constraints. Because consumers are likely to utilize a variety of information sources, an educational strategy that targets information multipliers like Cooperative Extension and other food and nutrition professionals, the media, industry, consumer, and sportfishing groups, and retail and food service businesses is needed to effectively and efficiently reach a broad consumer audience. Such information could also form the basis of marketing campaigns for seafood retailers, serving the needs of the consumer and industry at the same time.

Aquaculture offers opportunities for raising fish food organisms and for rebuilding or restoring depleted finfish or shellfish stocks. Seafood sales in the U.S. currently contribute to the trade deficit, because more than 60 percent of the $7 billion worth of the fish and shellfish consumed in the US is imported. The fact that the U.S. exports low value seafood, e.g., menhaden, and imports high value seafood, e.g., shrimp, is the main cause of the imbalance. The deficit for NYS is probably even greater because many of the important specialty seafood processors are dependent on fish that come from out-of-state fisheries.

Aquaculture developed through work of shellfishermen on Long Island and finfish aquaculturists in upstate New York, but New York has been comparatively slow to establish a well identified a coastal aquaculture industry Without a doubt there are impediments to aquaculture in NY (climate, disease, water bottom ownership, a poorly defined industry, lack of state support, etc.). This is especially true in the urban areas (high land and effluent cleanup costs) but demand for high quality seafood products continues to increase while wild harvest of fishery resources continue to decline in the northeast. It would be a plus for the NYS economy for the NY aquaculture industry to find a unique niche.

The seafood industry in New York State contributes at least $1 billion to the economy of the state and provides employment for at least 25,000 New Yorkers, not including restaurant sales. However, the seafood industry in New York and the rest of the Northeastern U.S. is not stable. Profitability often depends on the ability of seafood fishermen, wholesalers and retailers alike to anticipate changes in regulations and the marketplace, and to adapt with strategies that will continue to fill market needs and maintain profits. The business more and more rewards entrepreneurs and penalizes traditionalists.

The industry needs help in gaining lead times on some of these changes. This includes information about changes in government regulations and about changes in harvest sizes and/or rates instituted to sustain harvestable populations. In addition, the industry would benefit from development of new products and/or markets, distribution of information about new products as they become available, and marketing campaigns that balance the needs of the industry and of the consumer.

B. Objectives

a. Assist water-dependent businesses in improving management, operation programs, marketing strategies and responses to regulations and management policies to enhance business efficiency, effectiveness, cost competitiveness, and profitability.
b. Design and evaluate approaches to enhance tourism and eco-tourism opportunities that help develop and/or promote environmentally-sustainable economically-stable tourism markets.
c. Identify, assess and encourage the use of innovative techniques and technologies to prevent, control or reduce the environmental impact of marina operations, boating and other coastal-dependent businesses in a cost-effective manner.
d. Identify and innovative strategies to minimize or reduce dredging impacts by reducing the need for dredging and reusing, recycling, and/or disposing of dredged material associated with recreational boating facilities.
e. Assess the economic and environmental implications of innovative construction materials used in coastal areas.
f. Help develop and initiate, in partnership with industry groups and federal, state, and local regulatory authorities, effective consumer education strategies that support wise growth and development of the seafood industry.
g. Develop technical information on aquaculture organisms, systems and techniques to support rehabilitation or sustainability of aquatic populations and creation of economically sound business opportunities by overcoming current technological, marketing, regulatory or policy barriers to aquaculture development.
h. Develop innovative, cost-effective technologies for processing seafood and bringing new products to market.

GOAL 2. FACILITATE SUSTAINABLE USE OF ECONOMICALLY IMPORTANT COASTAL FISHERIES:

A. Rationale

Maintenance of sustainable fisheries in New York State, in the marine and Hudson River systems as well as the Great Lakes, is important to the state's economy. Industry estimates for 1998 suggest that commercial harvesting of fish and shellfish along New York's marine coast involves over 5,000 individuals and generates about $300 million in economic activity per year. Sportfishing, including party boat, charter boat, private boat, rental boat and shore angler fishing in marine coastal waters involved on the order of 584,000 individuals and generated expenditures in excess of $550 million, wages and salaries of approximately $250 million, and economic output in excess of $1 billion according to analyses by the American Sportfishing Association.

Results of a statewide freshwater angler survey conducted in 1996 by NYSDEC indicated that 35 percent of the anglers surveyed fished on New York waters of the Great Lakes for a total of 4.1 million days during that year. Comparisons of 1996 to 1988 estimates in 1996 constant dollars indicate a 50 percent decline in economic revenues. Although substantial controversy exists about

the validity of the absolute values of these estimates as well as the relative values of the estimates for commercial and sport fishing, it is clear that New York state's economy benefits greatly from the Great Lakes fisheries.

Because of the decline in economic value of the fisheries, their future sustainability is the predominant concern of the angling and charterboat communities on Lakes Ontario and Erie. Measures of sportfishing success reflect world-class fisheries in both lakes, but there have been recent indications that declines in food for the fish along with increasing impacts from zebra mussel introduction have produced increased pressure on the forage base and the food web. While catch rates, a measure of fishing quality, for salmonines have remained good on both Lake Ontario and Lake Erie, there has been a marked decline in angling effort from the peaks in the late 1980's, early 1990's.

Additional concerns have risen with respect to smallmouth bass fisheries in Lake Ontario. Over the last twenty years, populations of the fish-eating bird, the double-crested cormorant, have rebounded throughout the Great Lakes. Historically, wherever cormorants and other avian piscivores are abundant, controversy exists with man over the widespread perceptions that these birds compete directly with recreational and commercial fishing interests. With uncertainty for the future of Lake Ontario's sportfishery growing among recreational anglers, the cormorant issue has become increasingly volatile.

Changes have been occurring in marine fisheries as well. The aim of NOAA Fisheries management is to maintain stocks of fish caught for sale, sport or personal consumption at or above the level that would support the maximum sustainable yield on a continuing basis. Currently, of the 201 fish stocks managed by NOAA Fisheries in the Northeast Region, 85 appear to be at or above this level. However, there are 43 additional stocks for which scientific population status information is not available. Thus, it is clear that many fish stocks have declined to levels below those which would support the maximum sustainable yield on a continuing basis. Therefore, these are known as overfished stocks, even if habitat degradation rather than fishing effort is the immediate cause of stock decline.

U.S. federal marine fisheries management depends upon detailed and ongoing stock assessment efforts for a large number of economically important finfish and shellfish species. Stock assessment involves the collection of numerous fishery data sets, one key element of which is the estimation of fishing mortality. The degree of mortality (both natural and fishing), often dictates whether a population is static, increasing or decreasing. Adequate sampling of angler catches can provide good estimates of direct fishing mortality. Indirect or "hooking mortality" estimates, however, for those fish released alive due to bag limit, size limit, or seasonal constraints, are often not readily available. In the absence of good data, assessment biologists often extrapolate from estimates derived for similar species. In such cases, "the best available data" are typically inadequate for the task at hand.

The above information is key to stock assessments, but it is still necessary to deal with fish stocks or species which are determined to be overfished. NMFS has begun to focus on Essential Fish Habitat as a means to sustain fisheries. The hypothesis is that by protecting habitat essential for certain fish functions (spawning, nursing, growth, etc.) the stock will be protected. In more generic terms the question becomes what habitat to protect for various species and/or the more generic –what are the characteristics of refuges that make them successful in sustaining fished populations?

B. Objectives

a. Develop new or use existing tools to evaluate the effects of recent ecosystem changes on current and future sport and commercial finfish and shellfish fisheries and to identify harvesting and management policy responses to overcome barriers to sustainability.
b. Identify and evaluate modifications that will maintain or restore fisheries health by reducing inadvertent fishing mortality in recreational fisheries, bycatch in commercial fisheries and overall gear effects on habitats.
c. Develop information on how to control effort, how to identify sustainable effort, and how sanctuaries can contribute to fisheries sustainability.
d. Identify factors influencing disease prevalence in fish and shellfish and how to identify them, assess their impacts and manage them to reduce pathologies.
e. Develop capabilities to predict socio-economic responses of coastal communities to changes in fishery resources or accessibility.
f. Examine the effects of various physiological and behavioral processes on the dynamics of fished populations and their predators.
g. Develop a process understanding of population, system and community-level changes in ecologically or economically important living coastal resources.
h. Develop models that link hydrodynamics and water quality to fish or shellfish biomass and production.

B. COASTAL ECOSYSTEM HEALTH AND PUBLIC SAFETY

GOAL 3. IMPROVE THE QUALITY AND SAFETY OF NEW YORK STATE'S COMMERCIAL AND SPORT-CAUGHT SEAFOOD PRODUCTS:

A. Rationale

The seafood industry in New York is important to the economy, culture, and traditions of the Empire State. According to an industry profile developed by New York's Seafood Council and New York Sea Grant in 1995 and revised in 1999, the seafood industry in New York contributes at least $1 billion to the economy of the state and provides employment for at least 25,000 New Yorkers. The industry is comprised of many diverse but inter-related sectors including: fish and shellfish harvesters, docks, processors, wholesalers, distributors, importers, exporters, retail, and

food service businesses. Industry estimates, based on licenses or permits issued by the state in 1998, indicate that there are approximately 5,300 individuals or businesses involved in the commercial harvesting of fish and shellfish that contribute approximately $300 million in economic activity. Also, there are over 2,100 shoreside processing, wholesale/distribution or retail businesses that contribute over $800 million to the state's economy. Restaurant sales and employment are not included in the above estimates. This is an important gap because the majority of New York's large consumer population lives in coastal areas and seafood products are an important part of the diet and food traditions of New York residents. Although specific seafood consumption statistics for New York are not readily available, a 1992 estimate, based on U.S. Department of Labor Statistics, indicated that the average annual household expenditures for seafood eaten at home in New York City were among the highest in the nation and approximately 75 percent higher than the national average. On a national scale consumption of seafood in restaurants is about 1_ times that consumed at home. Thus, the economic citations above may be gross underestimates.

Although a number of large seafood firms are located in New York, the majority of these businesses are small to medium sized companies that employ from 2 to 25 people and have limited financial and technical resources. This makes it difficult or impossible for the industry to sponsor extensive research or technical development activities or conduct marketing campaigns. Against this background, NYSG efforts are likely to be very effective.

The seafood industry in New York and the rest of the Northeastern U.S. is facing a number of significant challenges and transitions. Steadily declining stocks of many traditional fish species, the increasing number and complexity of government regulations, rising product and overhead costs, and other factors related to highly dynamic domestic and international markets are having a significant impact on seafood businesses. To remain profitable, seafood businesses from fishermen to retailers need to anticipate, understand, and adapt to changing market conditions and regulations.

Changes in fisheries management and food safety regulations are also being developed and implemented at a rapid rate. In December of 1997, a new U.S. Food and Drug Administration regulation began requiring all processors, wholesalers, suppliers, and distributors to develop and implement a new Hazard Analysis Critical Control Point (HACCP) plan for their individual operations to control food safety hazards. Training and technical support were necessary for seafood businesses to successfully integrate HACCP into their operations. A survey of seafood businesses in NY indicated that over 80 percent of the firms would not have been able to comply with the new FDA regulation without the training course coordinated by Sea Grant. By the end of 1999 over 1,000 individuals had participated in training courses conducted by New York Sea Grant in collaboration with federal and state regulatory agencies and the seafood industry.

But HACCP procedures likely will change and evolve as new information on specific seafood safety hazards becomes available. Research information on the identification, occurrence, toxic action, and control of pathogens and toxins and plant sanitation that compromise seafood safety

will be important in that evolution. Continuing training programs using new and innovative formats and delivery mechanisms will be needed to help the industry utilize this information and incorporate it into their operations.

B. Objectives

a. Coordinate efforts by the seafood industry and federal, state and local regulatory authorities to enhance the safety of seafood products and to successfully complete the transition to a state-of-the-art food safety control system (e.g., HACCP).
b. Develop, test, and deliver new and innovative educational and training programs on seafood safety hazards and improved sanitation practices for consumers, the seafood industry and regulatory community as part of the national Seafood Education and HACCP (or other state-of-the-art system) Alliance.
c. Identify the risks of contaminant burdens, pathogens and chemicals for seafood safety, develop cost-effective analytical techniques, and determine strategies for minimizing, eliminating or remediating potential impacts.
d. Develop techniques to maintain or increase seafood quality during the period from catch to consumption.

GOAL 4. PREPARE FOR AND RESPOND TO COASTAL HAZARDS:

A. Rationale

New York's densely developed marine and Great Lakes coastal areas are subject to significant damages from coastal hazards such as shoreline erosion, flooding and wind. On the south shore of Nassau and Suffolk Counties the coastal flood plain encompasses some 70,000 acres, has a population of over 110,000 year round residents (plus an additional 35,000 seasonal residents) and contains over 40,000 residential structures. Along the shorelines of Great South Bay alone, the estimated value of structures potentially subject to flooding and erosion damages in 1999 was $7.9 billion. These threatened structures can account for 30 per cent or more of the tax base of local municipalities. While similar estimates for the Great Lakes regions are not available at this time, the value of at-risk properties is undoubtedly significant. The population and structures are threatened by hazards that can be both natural and human-induced and are often exacerbated during storm events. A single winter storm on Long Island destroyed over 100 homes, caused over $350 million in property damages, and created a new inlet which threatened an additional $275 million worth of development on the mainland.

The damages caused by these storms, in conjunction with predictions of increased hurricane activity over the next several decades, a rising sea level perhaps exacerbated by global warming, and an increasing coastal population, have resulted in an heightened awareness of coastal hazards and the need for innovative hazard mitigation measures. Presently, the U.S. Army Corps of Engineers is considering several large-scale storm protection and erosion control projects in New York. Two projects proposed for Long Island's Atlantic Coast alone could cost an estimated

$132 million and could have a major impact on the area's sensitive coastal environment. Implementation of these projects would require local and state participation in the form of a 30 to 50 percent financial match.

New York's Great Lakes coast also is a dynamic area in which erosion and deposition are constantly taking place. In many areas where there are homes, businesses, highways, parks and other manmade structures, erosion and flooding become social and economic problems. In areas where wetlands, barrier beaches and sand dunes exist, such erosion and flooding can lead to the degradation of the coastal environment. Coastal erosion, deposition, and flooding can also be exacerbated by lake level regulation, water diversion and coastal resource use.

Such coastal erosion and flooding in the Great Lakes region has resulted in an "erosion" of the local residential and business tax base where shoreline residences or businesses has been negatively impacted by physical erosion or flooding. This loss of property tax revenues, from both residential and business properties, and the potential loss of sales tax revenues from impacted businesses pose serious threats New York's Great Lakes economy. The costs of damages incurred from the erosion and flooding of roads, public boat launches and marinas, sewer lines, etc. and the costs of control structures directly effect the coastal economy.

New York's Great Lakes' water levels fluctuate through a natural annual cycle of approximately two feet; long-term, the lakes can fluctuate by as much as six feet. In fact, the last twelve months have witnessed a rapid shift from lake levels approaching record highs to levels below "normal" on both lakes. This suggests that historical limits may be exceeded in the future.

Again, along both the marine and Great Lakes coasts, communities and individual property owners are faced with identifying effective hazard mitigation, and erosion and accretion control alternatives that minimize adverse impacts while complying with increasingly stringent regulations. The state receives over 500 permit applications per year for small-scale flooding and erosion control projects. In some cases, local and state agencies are responsible for implementing environmental regulations, but are unfamiliar with coastal engineering or processes. Thus, they are recommending alternatives that minimize environmental impacts but do not provide adequate protection from erosion and flooding threats. Conversely, contractors, consultants and coastal property owners often tend to choose more traditional erosion control structures that may cause unnecessary environmental impacts because they are unfamiliar with newer, more environmentally compatible strategies for managing erosion problems.

Unfortunately, many of those involved with making decisions regarding the development and implementation of coastal hazard management and control projects do not have the technical expertise, resources or information to do so. Decision makers and stake holders need reliable, objective, science-based information to identify, assess and implement cost-effective, technically-sound coastal hazard management and mitigation strategies that will minimize coastal damages while maximizing the economic use and recreational enjoyment of our valuable shoreline areas.

B. Objectives

a. Use and demonstrate new information technologies (GIS, internet and web-based technologies, etc.) to help decision makers better quantify and evaluate the structural, social and economic impact of short- and long-term coastal hazards on communities and select effective potential mitigation measures.
b. Demonstrate and foster the use of new sustainable approaches for mitigating coastal erosion hazard problems that incorporate structural and habitat-enhancing techniques.
c. Provide technical assistance and advice to local, state, and federal partners in the development of large-scale and regional coastal hazard prevention or mitigation programs and projects.
d. Develop the capability to proactively assist coastal landowners, public decision-makers, and marine contractors to deal with coastal high or low water, flooding, and/or erosion events.
e. Focus or improve technologies to identify, predict and reduce the risk of natural hazards to structures, resources and users.
f. Develop models to use data on currents, circulation, sediment transport and other processes to predict the dynamics of filling and opening up of small, local harbors, bays, etc., as well as the dynamics of middle- and large size coastal geographic areas.

GOAL 5. ASSESS AND ENHANCE COASTAL WATER QUALITY:

A. Rationale

Since the early 1970s, the US Environmental Protection Agency via the National Pollution Discharge Elimination System regulations and the NYS Department of Environmental Conservation via the State Pollution Elimination Discharge System regulations have provided the basis for massive clean-ups of point source discharges into New York's coastal water bodies. Demonstrations of the successes of these activities include healthy spawning runs of striped bass and sturgeon up the Hudson River, return of shipworms to New York Harbor, openings of many bays and estuaries to sport and commercial harvesting, and burgeoning populations of predatory water birds on the Great Lakes.

Two major areas of continued point source water quality concern are Long Island Sound and the Hudson River. The sewage effluent that enters Long Island Sound carries nutrients, primarily nitrogen, which fertilize bacterial production and reduce oxygen concentrations sufficient to negatively influence biota. Although substantial progress has been made as a result of activities related to the Long Island Sound Study (NYSG is a participant) further efforts are needed to improve the water quality, biodiversity and useful productivity in the West End of the Sound. It may cost about $650 million for New York and Connecticut combined. On the Hudson River the Estuary Action Plan, a combination of pollution prevention, resource recovery and point source control is expected to prevent water quality deterioration despite continued coastal development.

In the Sound, the Hudson River and elsewhere, improved fate, transport and effects models are needed to explain the biotic responses that are observed and to predict the best ways to manage effluents to maximize control gains and minimize control costs. Continued public educational programs also are needed so citizens can evaluate and contribute to selection of proposed policies for water quality remediation and maintenance.

On the Great Lakes, the Lake Erie and Lake Ontario Lakewide Management Plans (LaMPs)are management strategies that take an ecosystem approach to protecting and restoring the habitats of these lakes. New York Sea Grant staff members are involved with the work of the LaMPs and the Remedial Action Plans that are part of the process. Staff assists with the work of the Binational Public Forum in educating stakeholders about the LaMP and the importance of its management efforts.

Of greater concern given the progress that has been made with point source pollution control is non-point source pollution. Unlike point sources, non-point sources cannot be managed at a specific point of discharge, but must be prevented or remediated by modifying land and water uses or by controlling air emissions. Non-point source pollution has been identified as a significant water quality problem from one end of the state to the other.

It is difficult to estimate the costs of non-point source pollution or remediation efforts. The environmental impacts of such pollution may be subtle and difficult to demonstrate, the impact and mitigation costs might be so site-specific as to make economic analyses difficult to predict, and the impacts might be intermittent. Finally, the need for and cost of clean up can be controversial. The long fight over the need for sediment removal to remediate PCB contamination in the Hudson River revolves around both need and cost issues. In this example, however, there is little argument that whichever estimate of cost is used, clean-up will be expensive, i.e., millions of dollars.

Substantial efforts by state and national agencies, both regulatory and resource management, are currently being directed toward the non-point source pollution issue. NYSG's best tack might be to invest in model development or validation, based on the scientific advances in process identification and quantification sponsored by others, of models to summarize and synthesize such information. In addition, NYSG staff can contribute significantly via development of educational programs to help others choose the most cost-effective methods to prevent or mitigate the effects of non-point pollution or to provide citizens with the information to help them evaluate policies proposed by their own representatives.

Most of the public drinking water for residents of NY's Great Lakes region is drawn from the lakes themselves and their connecting waterways. Since the early 1990s, at least seven NY drinking water treatment facilities have experienced episodes of moderate to severe taste and odor problems. It is theorized that such taste and odor problems are associated with both zebra mussel colonization of the Great Lakes and with changes in the lakes' phytoplankton communities which have shifted toward nuisance cyanobacteria ("blue-green algae") blooms. Also related to these

changes in the phytoplankton communities are concerns about the potential human health impacts of cyanobacterial toxins. Such toxins have been responsible for livestock deaths on North American ponds and were implicated in the death of pet dogs drinking from Lake Champlain.

B. Objectives

a. Design non-point source water quality education programs that will assist existing federal, state and municipal water quality coordinating committees and water body management programs, lake associations, local governments and estuary programs in protecting and enhancing the quality of New York's coastal waters.
b. Design and deliver best management practices for pollution prevention programs for non-point sources to property owners, municipalities, industries and businesses.
c. Determine the processes and rates of transport, fate and effects of point and non-point source anthropogenic contaminants and pathogens (e.g., MTBE, fertilizer, sewage) and develop appropriate models to assess their impacts on developed coastlines.
d. Design and deliver educational and outreach programs that meet the goals of the Lake Erie and Lake Ontario Lakewide Management Plans.
e. Develop techniques to assess the effects of water quality on the alternative uses of coastal resources and provide information to coastal residents so they can evaluate policies intended to prevent or reduce impacts on water quality.
f. Develop and support techniques to cost-effectively maintain high water quality in aquaculture effluents.
g. Provide information to assist state and municipal drinking water treaters, public health officials, and local governments in protecting and better treating public and private drinking water for bad taste and odor and cyanobacterial toxin.

GOAL 6. PROTECT OR ENHANCE COASTAL HABITATS:

A. Rationale

Habitat issues are important economically from one end of New York State to the other. Coastal habitats, the places where a myriad of animals and plants go through critical developmental stages, have been impacted for centuries. The causes have been direct, through filling and/or bulkheading to create more commercial space, or indirect, through changing of drainage or contamination by various materials, but the end result is a reduction or elimination of ecological function. It is important to maintain the function of existing coastal habitats and to rehabilitate degraded ones, even if doing so can be a complex task. Habitat also has become a key issue in coastal fisheries management. The Magnuson-Stevens Fishery Conservation and Management Act of 1996 established the Essential Fish Habitat (EFH) initiative in order to counter trends for over-utilization of fisheries resources within the 200-mile Exclusive Economic Zone. The Act required that the eight Regional Fishery Management Councils, in collaboration with NOAA Fisheries, give increased consideration of fish habitat in resource management decisions. The goal of the Act is to

establish sustainable fisheries by protecting the habitats that are important for the successful completion of their entire life history.

Use of EFH in fisheries management, which pertains only to marine fisheries, directly affects fishermen and seafood processors by controlling catch and availability of raw materials. In the Peconic Estuary on eastern Long Island, there are over 100 species of plants or animals that are endangered, threatened, rare, or of special concern. The estuary provides important habitat, as well as spawning and nursery grounds, for a wide variety of aquatic organisms, some of them important targets of sport or commercial fishermen. Similar concerns focus on habitat in the South Shore Estuary. In the New York Harbor or Bight, habitat destruction and alteration have impacted wildlife populations and reduced breeding and nursery grounds of various species. In fact, of the 100 square miles of wetlands that existed in pre-colonial times in New York City, only 14 square miles remain today. Dredging, sedimentation and contaminants have impacted underwater habitats, as well. In the Hudson River, millions of dollars of revenue are generated from sport and commercial fishing. Habitat destruction is believed to be a major contributor to the decline of striped bass, Atlantic sturgeon, and American shad. Finally, habitat issues also are critical for sustainability of Great Lakes' resources. According to the 1999 State of the Lakes Report, prepared by the USEPA and Environment Canada, "Wetlands are important ecologically, socially, and economically, and are one of the most productive ecosystems in the world. Wetland plant and animal communities are not only adapted to life on the edge of the terrestrial and aquatic zones, they depend on it and on lake level fluctuations for their continued survival." Many of the cities and villages along Lakes Erie or Ontario have been located near freshwater estuaries where streams or rivers enter the lakes, putting these important habitats right at the crux of development.

Although it is clear that maintenance, rehabilitation and restoration of coastal habitats provide ecological and economic benefits, it is difficult to quantify their value. Commercial and sport fishing are worth hundreds of millions of dollars to New York State's economy. To the extent that protecting EFH maintains the sustainability of these fisheries, these economic contributions will be maintained. Boating and swimming in Long Island Sound have an annual value of over $4 billion. Biologists and economists have long struggled with the protocols for estimating the value of ecosystem processes and their loss. In addition, it is difficult to predict the end product of rehabilitation or restoration because of the dependence of ecosystem structure and function on combinations of conditions and components, but the continued public pressure for access to coastal areas for recreational boating, fishing, swimming, birding and other purposes indicates the high qualitative value that the citizenry place on these habitats. In addition New York's Clean Water/Clean Air Bond Act is making millions of dollars available for habitat restorations—another indication of the value attributed to habitat.

Because of the increased pressure that is expected on coastal resources, it is important to manage development and public access in the coastal zone to maintain existing habitat and to restore degraded areas. One promising focus is development of visitor interpretation programs. These seem to have been effective in reducing visitor impact on delicate coastal resources. Further support for this finding is needed, as is research to identify protocols that are more effective in

protecting resources. For fisheries, EFH needs to be identified and reasonable and effective criteria need to be established for adequate protection. For other coastal habitats, a toolbox of methods for integrating development and habitat protection and rehabilitation will need to be developed. Citizen support for such efforts will be critical for raising the funds necessary for successfully dealing with habitat issues. Without the support of an informed citizenry, efforts to protect and restore critical habitat will be hampered. Thus, efforts to identify critical habitat areas, for either protection or restoration, to educate the public and its representatives and to involve them in habitat restoration projects will be needed as well. NYSG staff participating with the USEPA and state resource agencies has identified some 145 New York State sites on Long Island Sound, 37 of them ranked as high priority sites for habitat restoration, as part of the Long Island Sound Study. Efforts are being made to co-fund such activities with the local communities. The Peconic Estuary Program has identified over 50 high priority sites for habitat restoration. Plans are being prepared to identify sites in other coastal areas in New York State, but these efforts are needed, as well as ones targeted specifically at local governments and communities.

B. Objectives

a. Educate community groups, professionals and agencies about the benefits of and techniques for improving the quality (structure or ecosystem function) of threatened, degraded or compromised coastal habitats (e.g., Areas of Concern).
b. Develop and promulgate educational programs that estimate human carrying capacity and manage human access to coastal areas.
c. Use small grants programs, endowments and public involvement to provide support for coastal habitat restoration.
d. Develop or refine techniques to determine the ecological value of coastal habitats, to examine the effect of human activities on habitat quality and/or habitat fragmentation, to determine if or when habitats have been degraded, and to identify and evaluate the effectiveness of remediation techniques to restore those habitats.
e. Develop tools to support manipulation for long term maintenance of wetland habitats threatened by sea level rise.
f. Develop, collect and disseminate research-based information about essential fish habitat that will assist managers, communities, and the fishing industry in managing finfish and shellfish resources.

GOAL 7. CONTROL THE SPREAD AND MITIGATE THE IMPACT OF NON-INDIGENOUS SPECIES (NIS) AND AQUATIC NUISANCE SPECIES (ANS) IN NEW YORK'S COASTAL WATERS:

A. Rationale

U.S Secretary of the Interior, Bruce Babbitt, told attendees at a January 1999 Sea Grant Conference on Marine Bioinvasions that "Marine bioinvasions have large consequences for our food supply, our economy, our fishing industry and human health. He further opined that "These

invasions also threaten to degrade and homogenize coastal waters in every corner of the seven seas."

During the last half century the rate of invasion of Non-Indigenous Species (NIS) or Aquatic Nuisance Species (ANS) has increased substantially. Reasons for the increase in invasion rate primarily are related to changes in human activities. International shipping has increased. Cargo ships ply their way along more diverse trade routes at faster rates than ever. The ships are much larger resulting in the need for larger and larger volumes of ballast to maintain ship-worthiness when they are emptied. The water quality in the ports of call has improved dramatically as a result of efforts world wide. Thus, larger quantities of ballast containing larger quantities of (still) living plankton, etc. are dumped into new environments. The seeding is much more likely to reach the threshold required to support successful reproduction in the new environs. In addition, distribution of brood stock for global aquaculture and of exotic species (and their parasites) by the aquarium industry both contribute an additional source of NIS/ANS.

NIS/ANS also have caused major problems in NYS. The green crab that threatens the Northwest is becoming a problem on the shores of Long Island and other East Coast areas. The Great Lakes have the sea lamprey, the zebra mussel and the Eurasian ruffe, all of which already have caused declines of other species in the Great Lakes. These species may only represent the tip of the iceberg, however, because more than 140 non-native aquatic plants, fish, algae, mollusks and other invertebrates have entered the Great Lakes basin and pose threats to the Basin's ecological integrity. These latter species include the alewife and Asian clam, as well as recent invaders such as the round goby, the spiny and fishhook water fleas, the blueback herring and the New Zealand mud snail. Which of these species, if any, will cause noticeable changes in the ecology of the Great Lakes remains to be seen.

Economic estimates of the impacts of NIS/ANS have usually been based on worst case estimates. For most species, there are no data to evaluate the validity of such estimates. However, there have been two studies of the actual economic impacts of zebra mussels on the Great Lakes, one of which was conducted for the National Aquatic Nuisance Species Clearinghouse by a New York Sea Grant specialist. The reported impact in that study for the period of 1989-1995 was about $69 million for some 339 facilities throughout the Great Lakes and Upper Mississippi Basin region (about $204,000 per facility). When looked at by facility type, nuclear power plants averaged $822,000 each, hydroelectric facilities averaged $83,000 each, fossil fuel electric generating facilities averaged $145,000 each, and drinking water treatment facilities averaged $214,000 each. Extrapolating from these facilities to the total for the Great Lakes yields a 1989 –1995 figure close to $300 million. Extrapolating further to 1999 to cover the additional years and the additional geographic range, would yield impacts probably nearing $750 million to $1 billion. These estimates are probably low.

New York Sea Grant is in the forefront of the national response to this invading organism, taking the lead in developing and implementing an aggressive, proactive, multidisciplinary program of interagency zebra mussel information workshops, and helping to establish and train state and

regional multi-agency zebra mussel task forces and working groups nationwide. All of these other species also have the potential to cause significant ecological and economic harm. Unfortunately, decision makers in many regions remain almost totally unaware of, and unprepared for, the introduction of nonindigenous invasive aquatic organisms beyond the zebra mussel.

Sea Grant's National Aquatic Nuisance Species Clearinghouse was established in 1990 to collect and disseminate information pertaining to the biology, spread, impact, and control of zebra mussels, and has since expanded its mission to include other Great Lakes, freshwater, marine and estuarine nonindigenous, invasive aquatic nuisance species. The Clearinghouse is an international project, playing a high-profile role as a nexus for identifying aquatic nuisance species research and for linking researchers with similar interests. The Clearinghouse also serves as a major link between the research community and an array of end-users, facilitating the transfer of aquatic nuisance species research information and technology among universities, elected and appointed officials, governmental agencies, resource managers, industries, and decision makers.

This educational activity is invaluable to industries and municipalities facing NIS and ANS. Exchange of information can help identify which organisms are likely to be problems for individual facilities. Successes and failures from the past can also help facilities choose effective and efficient control or mitigation techniques without costly implementation of methods that will fail under local conditions. The savings can be substantial.

There is also a need for research on control techniques. After an NIS/ANS has taken hold, it is unlikely that it can be eradicated. However, control can be cost effective. Several million dollars are spent yearly to suppress the sea lamprey, an invasive species that preys on Great Lakes fish. For every dollar that is spent on control over $30 is realized in increased fisheries revenue. This certainly is an impressive benefit to cost ratio. Research efforts aimed at control must be focused on specific methods that appear cost effective and adoptable by state and federal regulatory agencies.

B. Objectives

a. Educate the public and other stakeholders throughout North America about ANS introduction, spread, control and impact (industry, drinking water tastes and odors, ecosystem components) mitigation via traditional methods, as well as operation of the National Aquatic Nuisance Species Clearinghouse and World Wide Web searchable database.
b. Determine the causes of initiation and cessation of ANS such as harmful algal blooms (e.g., brown tide), in order to develop strategies for prevention or mitigation.
c. Improve our understanding of how human activities influence exotic species (including diseases and parasite introductions) distributions and impacts.
d. Determine the impacts of introduced species and harmful micro-organisms and develop effective response, detection, and control mechanisms.

C. EDUCATION AND HUMAN RESOURCES ISSUES

GOAL 8. DEVELOP THE CAPACITY OF NEW YORKERS TO PARTICIPATE AS PARTNERS IN COASTAL ISSUES:

A. Rationale

Increasing needs for wise management of coastal resources provide an impetus for coastal sciences education of New York's citizens of all ages. Current trends of population growth indicate a burgeoning interest in coastal areas for habitation, both in the marine and Great Lakes' districts. The pressures that these trends bring to bear on coastal resources are exacerbated by the desirability of these same areas for recreation on a regular basis throughout the year or for annual vacations. Wise management is dependent on development of science-based information, application of such information to management questions, and selection of the best people and policies to accomplish the goal of sustainability. Only with an educated community of scientists, policy makers, regulators and citizens is this likely to be accomplished.

An educated community depends on effective teachers and courses that target the broad range of topics related to sustainable coastal development. There are growing indications that math and science education in many of the nation's schools needs refurbishing. More specifically with respect to Sea Grant issues, one of the 1998 Year of the Ocean Discussion Papers concluded that "nationally, preservice teaching and teacher credential programs rarely provide any special instruction in oceanography". Educators need research backed information, and access to government funded knowledge both at agencies and universities via in-service opportunities and/or non-formal education opportunities. Teachers also need support to include ocean/coastal issues in curricula following trends toward having students participate in hands-on science using real time data available on the World Wide Web or CD-ROMs.

Although early educational experiences can create the interest in science that carries over into career decisions, training of the next generation of coastal scientists is conducted primarily in graduate schools. Undergraduate research and/or fellowship experiences can help students make informed decisions about career goals in science. However, only a fraction of the students will actually continue in research careers. Thus, varied courses and experiences may support movement of students into careers that contribute to coastal management. Never-the-less, it is the graduate students that most assuredly will provide the scientist experts and science-based information that contributes to decision-making for the next generation.

There are no formal educational requirements for policy makers or citizens, but an informed or scientifically literate citizenry, seems likely to benefit society most. Scientifically literate citizens will elect appropriate representatives and select wisely among societal alternatives. Informed and scientifically educated legislators or regulators can interpret science in the context of societal goals.

Although it would be difficult to derive estimates of savings from educational programs, unwise decisions about allocation of coastal resources do incur costs. If decisions about such allocations

are under-protective, future generations will lose use of the resource altogether or be required to pay for mitigation or restoration. If decisions are overprotective of resources, money will be lost in inefficiently using them.

The discussion above indicates the need for multi-focused efforts to provide coastal and oceanographic science education to New York State's and the nation's citizens. This must include formal curricula, courses and experiences for students and teachers from primary through graduate school. Just as important may be informal information transfer to youth and adults and to national and state legislators and regulatory agency personnel. The scope of the task will require setting priorities based at least in part on maximizing audience and the impact of the education for society's benefit.

B. Objectives

a. Work with Marine and Great Lakes educators to integrate new technologies and Sea Grant resources into K-12 classrooms.
b. Prepare the next generation of coastal science professionals and decision-makers by supporting Sea Grant Scholars, by using New York's colleges and universities to transfer Sea Grant-developed information and by supporting Sea Grant Extension educators' service as adjunct faculty in selected courses and institutions.
c. Develop a New York State undergraduate internship program.
d. Develop and distribute educational materials to Congress, state legislators, and stakeholders on the principles and theory of resource management and uncertainties in current methods for making predictions and management decisions.
e. Provide non-formal education on sea grant issues and techniques to groups such as scouts, 4-H groups, etc.
f. Develop and use new communications techniques and strategies (including publications, the internet and the media) to aid outreach to stakeholders and to the general public in order to foster an educated citizenry.

GOAL 9. DEVELOP NEW PARTNERSHIPS

A. Rationale

Several important coastal development topics and/or geographic areas within NYS are not yet well served by NYSG, because of budgetary limitations or have not yet been identified. By developing partnerships with other organizations with similar interests it may be possible to collaborate and use the resources of all partners combined to provide the services that are currently lacking and respond to environmental crises. There are currently several opportunities for collaboration that NYSG might use to extend its coverage.

The New York Harbor or New York Bight is one of the highest priority geographic areas that NYSG is not currently serving. The Harbor/Bight is blessed with abundant and diverse natural resources even though it is the center of the most densely populated region in the US. Over 20 million residents fish, boat, or swim there, generating billions of dollars for the regional economy. All these recreational and commercial activities are conducted almost within sight of a world class combined passenger port, that generated over $115 million in employment compensation and over $55 million in federal, state and local tax revenues from the cruise industry and cargo port, that shipped cargo valued at about $55 billion in 1992.

If a suitable partner or partners can be found to share costs, urban extension outreach efforts in New York City would offer the chance to provide services to a region where a substantial fraction of New York's citizens live. This would include the high percentage of minorities and recent immigrants that often have very specific needs with respect to foods and uses of coastal resources. Recent improvements in environmental conditions in the Harbor/Bight cannot hide the fact that there still exist substantial problems with or opportunities for reclamation. Problems include human use impairments such as fish consumption advisories and bathing beach or shellfish harvesting area closures and declines in fish and shellfish populations. The port has also had to deal with problems associated with disposal of contaminated dredged sediments. These problems largely result from habitat degradation or loss, toxics, pathogens, floatables and/or nutrients and organic enrichment. This urban outreach program could be instrumental in providing the information for the general public, legislators, regulators and resource agencies to establish wise policies, effective regulations and efficient mitigation strategies.

New York Sea Grant in cooperation with the University of Vermont has taken leadership in forming a Lake Champlain Sea Grant program to focus efforts in the Lake Champlain Basin and increase NYSG's ability to serve an area of the state that has not been served fully in the past. Many of the environmental concerns and social and economic conditions within the Lake Champlain basin are closely related to those in the Great Lakes region in New York. In addition, outside of the Great Lakes, Lake Champlain is the largest freshwater lake in the United States, with more than 650 thousand people currently living in the drainage basin. In 1990 the Great Lakes Critical Programs Act of 1990 included the "Lake Champlain Special Designation Act of 1990." At that time New York Sea Grant Extension began offering minimal outreach support to residents of the Lake Champlain basin because of this legislative change. This SG educational support has been "reactive" and included education programming on the following issues: exotic species introductions and impacts, water quality, underwater resource management, fisheries biology and management, marina and boater response to zebra mussel impacts, and marina pesticide applicator training. To date the programming, which has been in response to specific requests, has been well received.

A number of themes in which Sea Grant Extension efforts may make major contributions to the sustainable development of the Lake Champlain Basin were identified by the Lake Champlain Management Conference (1996). The highest priority action areas identified in that comprehensive bi-state planning effort were to "reduce phosphorus in targeted watersheds in the

lake, ... prevent and control persistent toxic contaminants, and ... implement a comprehensive management program for nuisance non-native aquatic species." This and other topics will be the focus of a Lake Champlain Extension program.

A comprehensive Lake Champlain Sea Grant Program, the first Sea Grant basin-based approach, which utilizes an integrated research, extension and education approach, could have significant positive economic and environmental impact in this important geographic area.

New York is home to more than 65,000 Native Americans living on numerous sovereign territories across the state and interspersed within the larger population. In addition, New York's geographical location on the eastern seaboard places the state among approximately 500,000 Native Americans. As the heartland of the Iroquois confederacy, New York has a long and continuing political, social, and cultural Native tradition. Its state government has an important history of official ties to Native governments, especially in the areas of education, health and economic development.

The New York Sea Grant Program has worked with Native populations since the early 1970s, but it was not until recent years that Sea Grant, Cornell Cooperative Extension and the American Indian Program partnered to initiate a major educational project, which they termed the Native American Lands Initiative. This initiative is recognized as Cornell Cooperative Extension and Sea Grant's finest outreach effort with New York's Native communities. In 1996 this effort was given the "Award of Excellence" by the Northeast Cooperative Extension Directors.

New York's Native communities are actively seeking to develop skills and leadership to address community problems related to the environment, community development, economic development, and governance. Our land and sea grant institution has the capability to assist Native communities in resolving issues identified at the grass roots level. This will be accomplished by bringing together Native communities in New York State with Sea Grant, Cornell Cooperative Extension, and the American Indian Program, in a productive partnership using human and material resources more efficiently toward resolving coastal resource focused problems identified by those Native communities.

On a very different level, but also important NYSG are partnerships with the several institutions that house the NYSG Extension offices. Utilizing the successful partnership of the Great Lakes Program at the University of Buffalo, and the development of the unique joint position of Associate Director/Extension Specialist, we need to develop other strong collaborative efforts. Such activities will demonstrate that such on-campus relationships have reciprocal benefits for both organizations.

B. Objectives

a. Initiate a Sea Grant urban extension outreach effort in New York City.

b. With the University of Vermont develop a comprehensive Lake Champlain Sea Grant program.
c. Develop a comprehensive coastal and aquatic outreach effort with New York's Native Peoples, in concert with Cornell's American Indian Program, to aid them in managing and utilizing their aquatic resources.
d. Respond to emerging coastal needs
e. Maintain and improve positive relationships between the NYSG and existing and potential host institutions.

VI. New York Sea Grant's ROLE AND GENERAL OPERATIONAL APPROACHES

As was briefly indicated in the Vision/Mission section above, optimizing the impact of the NYSG program in the immediate future requires NYSG activities aimed at maximizing the organization's contributions toward wise policy making and management of New York State's coastal resources.

First, NYSG must maintain and improve its reputation among decision-makers as a recognized leader in the generation of objective science-based information that is applicable to effective management, use, and preservation of New York's coastal resources. To gain this recognition, NYSG program management will use several operational approaches. NYSG management will continue efforts begun to bring the different elements of NYSG into the research planning and selection process. An annual meeting for all the professional staff of administration, extension and communications will provide for effective communication and program-wide planning activities. The link between the research and outreach activities of the program will be maintained by continuing the formal involvement of Extension staff in preparing the biennial solicitations and by encouraging the interaction of Extension staff with researchers seeking funding from Sea Grant to maximize potential impact of the work proposed. To more effectively communicate information about coastal issues and NYSG research, new projects will be developed including production of special printed publications, videos, and effective use of electronic platforms such as the World Wide Web. Research efforts will continue to be directed at developing a conceptual framework and predictive capabilities so that understanding gained in one system can be applied to others. Because almost all environmental problems are interdisciplinary in nature, emphasis also will be placed on cross-disciplinary approaches whenever feasible.

With these issues in mind, NYSG initiated a major Focus Area program in 1999 that combines research and outreach aimed at a general topic area. During each biennial solicitation, about 30 percent, currently about $300,000, of the available base budget research funds is set aside for a proposal for a multidisciplinary, integrated project aimed at making threshold or stepwise progress, rather than just incremental advances, on a NYS coastal development problem or opportunity. A similar level of outreach effort will be targeted toward ensuring the impact of the

research. The focus area will be determined based on stakeholder input from the NYSG Program Advisory Council as well as representatives of other agencies, environmental action groups, industry, business and the public. Selection of the area will be based on state balance, significance of the problem for the NYS economy, available expertise within the state, and roles for extension, education and communications staff as well as researchers in the outcomes. Should no scientifically or programmatically acceptable proposal be submitted or judged scientifically sound and programmatically valuable, the funds will be made available for the individual projects typically submitted in response to the omnibus.

In order to provide more focus to the typical single investigator research funded, NYSG will continue to give priority to a limited number of research areas in any given call. These priority areas will continue to be determined by consultation with NYSG's Extension staff and PAC. Scientific merit will continue to be the primary consideration in screening projects, but how well the proposed research meets program priorities and management needs will be important in deciding which scientifically sound proposals to fund. NYSG expects to continue to fund a continuum of research from the very basic to the applied.

Additional mechanisms will be established to obtain information needed to manage or develop coastal resources that cannot be addressed through the competitive investigator initiated research program. These may be addressed through research or demonstration projects initiated by NYSG Extension staff or through very specific calls to solicit research on a specific identified topic. One such area that received recent focus was socioeconomic evaluation of specific coastal resources. NYSG will also attempt to keep staff and their activities on the cutting edge of technology and issues by stimulating professional growth of staff via attendance and participation in professional meetings, advanced education, and alternative work assignments with related programs. As stated above, a portion of each specialist's activities will be expected to be directed toward maintenance of scientific credibility. NYSG will continue to support regional and National Sea Grant issues.

Second, NYSG will need to work to increase its role as a key coordinative liaison among academia, the public, businesses, industry, the legislature, and state and federal agencies regarding coastal issues throughout New York State and regionally. To facilitate this role at the negotiating table, NYSG management will: continue extension efforts to provide assistance to local planners and coastal related businesses, help businesses and industries to comply with regulations and adapt to changes in economic and environmental situations, and help to promote development of an informed citizenry. NYSG also will devote more effort towards bringing people together to talk about emerging issues by sponsoring topical workshops and forums to convene technical experts from in-state and out-of-state together with others to discuss emerging or continuing issues of importance. Staff will continue to play an active role in serving on advisory groups concerned with coastal issues throughout the state, and NYSG will continue to provide funds to co-sponsor workshops developed by others related to its programmatic goals.

Third, NYSG will maintain support of the role of extension in assisting decision-makers to identify, define, and evaluate available options in support of restoration, protection, management,

utilization, and sustainable development of coastal resources. Four efforts will contribute to this demonstration. Extension efforts will be targeted to inform decision-makers through personal interaction, preparation of fact sheets and targeted newsletters, and local programming to provide them with ready access to technical information necessary to support effective management and development. Decision-makers will be included as active participants in forums and workshops designed to provide technical information on emerging issues to inform them of upcoming problems and provide a vehicle for productive dialogue and planning between interested scientists, managers, businesses, and the public allowing them to approach solutions to these problems collectively. The program's research efforts will be focused to provide predictive capabilities and respond to emerging issues. Because coastal managers usually need to respond to changing situations rapidly, a thorough understanding of how coastal ecosystems respond to stress, both anthropogenic and natural, must be in place prior to decision making. When this is not possible, research efforts should be directed at developing a conceptual framework and predictive capabilities so that understanding gained in one system can be applied to others. Limited funding also will be provided through program development funds to investigate emerging issues that cannot wait to be addressed through the regular biennial Call for Research Proposals. Extension activities will be communicated to decision-makers, to continue production, promotion, and distribution of printed materials describing program activities and accomplishments and informing people about upcoming issues on a regular basis. Efforts to publicize information of timely importance through the media will be expanded to help ensure its use in decision making.

Fourth and finally, management and staff of NYSG will work to better integrate the research, extension, education and communications activities to provide information to help decision makers solve problems or take advantage of opportunities related to sustainable development of NYS's coastal resources. The annual meeting mentioned above will aid this integration. Issues will be organized visually using a topical matrix of efforts relating to the research, extension, education and communication components of NYSG to evaluate what is being done and why and what is not being done and why not. Network Advisory Committees will be used to identify needs from all components of NYSG. Media contacts will also be asked to identify key issues that seem to be lacking in information. Researchers and educators will be solicited for their opinions about critical and promising information gaps. For the biennial omnibus solicitations, priority research topics will be chosen that generally apply to a broad range of coastal issues, i.e., are focused on techniques, generic processes, etc. Extension and other staff will be built into the planning, making them available to discuss the usefulness of proposed work with any investigator.

VII. PREPARATION OF THIS STRATEGIC PLAN

Prior to development of this strategic plan, NYSG had been using *Framework for the Future* as its strategic plan since its completion in 1995. In its development, the *Framework* was discussed and reviewed over several iterations by program staff, as well as NYSG's Board of Governors and Program Advisory Council (PAC). The PAC at that time was a stakeholder group of about 15 agency, industry, business and academic representatives. One representative each came from New

Jersey and Connecticut, whereas the rest were from New York. The eight research priorities developed, modified and refined by the BOG and stakeholders during preparation of this document have formed the basis for development of the NYSG biennial omnibus as well as supplemental calls for pre-proposals or proposals through the 1999 solicitation. During its last revision, the *Framework* was expanded to include approaches being undertaken to support New York Sea Grant's goals, and a section on program evaluation and development of implementation plans.

Framework for the Future **was organized around five goals:**

1) To enhance Sea Grant's role as a recognized leader in the generation of science based information needed to effectively manage, preserve, and utilize New York's coastal resources;
2) To be a key coordinative liaison among academia, the public, businesses, industry, the legislature, and state and federal agencies regarding coastal issues throughout New York State and regionally;
3) To be proactive in assisting decision makers to identify, define, and evaluate available options in support of restoration, protection, management, utilization, and sustainable development of coastal resources;
4) To maintain and develop programs supporting the training of the next generation of professionals needed to investigate and manage the multidisciplinary aspects of coastal issues; and
5) To raise general awareness of and provide science-based information about the importance of the coast to recreation, economic development, and quality of life in New York and the role of NYSG in maintaining and enhancing coastal resources.

Rather than technical topics, problems or opportunities for coastal sustainable development, these goals focused NYSG's role in the state and the nation and how it could contribute to the process of coastal resource policy and decision making.

On May 11-12, 1998, NYSG held a strategic planning meeting at the Gideon Putnam Hotel in Saratoga Springs, NY. Robert Crangle, the same consultant who was helping the NSGCP with aspects of strategic planning at the national level, facilitated the retreat. Other participants at the meeting included two nationally recognized experts in coastal issues (Dr. Jerry Schubel and Dr. Michael Donahue), representatives of the NYSG Program Advisory Council and the NSGCP, and all NYSG technical staff and managers. Schubel and Donahue presented marine and Great Lakes' perspectives, respectively, on the trends and needs that NYSG would have to respond to in the next decade or so. The general format for the rest of the meeting involved presentations on various aspects of NYSG as it currently exists, followed by extended discussions amongst the staff and outside participants of which structures and operational protocols to modify and which to maintain for the future.

In response to the Government Performance and Results Act, the NSGCP made several changes in how it deals with the state programs. First, they shifted from strictly core budget awards to budgets that include a merit component. This component is decided based on competition

amongst the state programs. They also switched from providing prospective direction to the state programs based on consideration of individual proposals to retrospective evaluation based on the overall program. Finally, they changed the basis of evaluation to impacts of program activities on stakeholders rather than products *per se*. One part of the assessment to determine a program's merit increase would involve a review visit every four years by a Program Assessment Team. The Program Assessment Team evaluation of the state programs would be based on four criteria. Fifty per cent of the evaluation would be based on whether the program had produced significant results or outcomes for stakeholders. Twenty per cent would be based on organization and management of the program (institutional setting, choosing proposals, recruiting researchers, using state of the art methods for program components). Twenty per cent would be based on how well the program is connected to clients needs. Finally, 10 percent would be based on effectiveness of strategic planning and the relation of program goals to those of the NSGCPO.

It also seemed an appropriate time for re-evaluation for NYSG internal reasons as well. The NYSG strategic planning document *Framework for the Future* had last been evaluated in 1994 or 1995. Planning for the 2000 Biennial Omnibus Solicitation was just beginning. *Coastlines*, the lead publication of NYSG, was being revamped. Finally, the current director, associate director and communicator had not been NYSG employees at the time that *Framework for the Future* was developed.

As a result of discussions at the 1998 meeting, several strategic changes were planned for NYSG. A sixth goal was added to the five that were in the original *Framework for the Future*. Goal six was to integrate the NYSG research, extension, education and communications activities to provide information to help decision makers solve problems or take advantage of opportunities related to sustainable development of New York State's coastal resources. Participants also agreed that once a summary document for the meeting was completed the focus of a new strategic plan would be decided upon. A second change was to make a special effort to recruit and fund at least one researcher new to NYSG during the 2000 omnibus solicitation. A third change was to come up with a draft plan for a Major Focus Topic (Research, Extension, Education, and Communication) for the 2000 Biennial Omnibus Proposal. This last change requires some explanation.

The rationale for and a summary description of the major focus topic are as follows. Considering the extensive development already in place in much of New York's coastal zone and continuing development in less populated areas, better understanding of how coastal ecosystems respond to stress, both anthropogenic and natural, will be essential for effective development, protection, and management. Research efforts, by necessity, will be directed at developing conceptual frameworks and predictive capabilities so that understanding gained in one system can be applied to others. Because most environmental problems are interdisciplinary in nature, cross-disciplinary approaches will provide a better chance, or be required, for success. It is difficult to include such complex concepts or frameworks in proposals with a $200,000 cap over two years. NYSG is responding to the perceived need to fund such proposals by incorporating a major Focus Topic program into the biennial omnibus solicitation.

The focus area for 2000 was determined based on NYSG staff suggestions, as well as stakeholder input from members of the NYSG Program Advisory Council, and representatives of other agencies, environmental action groups, industry, business and the public at a meeting in Albany in November 1998. For the 2000 omnibus, the topic chosen was "Sustaining and Rehabilitating New York's Coastal Fisheries", referring to shellfish as well as finfish. The choice of topic was based on state balance, significance of the problem for the NYS economy, available expertise within the state, and roles for extension, education and communications staff as well as researchers in the outcomes. Extension and research staff from NYSG then met with researchers around the state in two meetings in December 1998, one in Stony Brook and one in Syracuse. Presentations by two Extension specialists summarized some of the potential problems, e.g., oligotrophication or nutrient shifts; changes in forage base dynamics; water quality, fishing, and stocking effects; reductions or changes on fish habitat; and benchmarks for (or quantification of) restoration/mitigation activities. One of the two full proposals invited was funded starting in February 2000. If this Focus Area strategy is successful we plan to continue this strategy, although probably with different topics during each biennial solicitation.

In the fall of 1998, the NYSG management team decided that it would be appropriate to prepare a strategic plan that emphasized technical problem or opportunity goals. The five original goals from *Framework for the Future* plus the one added after discussion at the Saratoga staff meeting still would be included in the plan. However, they would be included as roles or approaches. In fact, NYSG's success in achieving the technical goals would be dependent on whether NYSG played these roles with decision-makers in the state. The technical topic orientation of the new strategic plan would have several advantages. First, it would complement or coincide with the NSGCP and NOAA strategic plans. Second, it would fit better with the ways in which NYSG Extension specialists are hired and work with stakeholders as well as the ways that research projects are solicited and chosen. Finally, it would provide a basis for determining outcomes of NYSG activities, especially those that result from integrated activities in research, extension, education and communication.

After discussions among the Management Team about the three major Issues defined in the NSGCP strategic plan (Economic Leadership, Coastal Ecosystem Health and Public Safety, and Education and Human Resources), a draft list of Goals was distributed to NYSG technical staff for evaluation and comment early in 1999. Comments by the NYSG staff were incorporated into the list of 12 Goals included under the three coastal development issues. In March and April, NYSG Extension management and specialists took the lead in drafting strategic objectives for each of the 12 Goals. Extension management then consolidated, revised and edited the list to make it more consistent and unified. [During the process of developing the final list of Issues and Goals, their numbers shifted several times. Each time the shift was made to examine advantages and disadvantages of the new organization. The final list represented a balance.] This preliminary compilation of Objectives was distributed to the Management Team in late May and was sent to all NYSG staff for comments, modifications and/or additions. During a June 15 conference call with the Executive Committee of the NYSG Board of Governors this list of strategic goals was

discussed as was a draft outline for the strategic plan. The Executive Committee also suggested that terminology be chosen to ensure the interpretation of coastal to mean more than marine (i.e., to include freshwater) and of "seafood" to include fresh water fishes plus aquaculture products and aquatic plants.

Work on the sections of the strategic plan other than the Issues, Goals and Objectives began in late 1998 and continued intermittently during the year. The management team decided on a draft outline for the whole plan in June after consideration by the Executive Committee during a conference call. A second draft of the full strategic plan, lacking only the Issues, Goals and Objectives and rationale statements, was completed by September. Outlines of the strategic plan were also distributed to the PAC and BOG. Presentations of the details to be included in the strategic plan were made at a meeting of each group in September. Comments were recorded to be included in the next draft of the plan. A similar presentation, incorporating suggestions made by PAC and BOG members, was made to the NYSG staff at a meeting held in November.

The list of Issues, Goals and Objectives was finalized in December of 1999. In June of 1999, a draft list was distributed to 17 senior researchers with extensive experience with NYSG and with the coastal problems and opportunities in New York State. Extension specialists and their Program Advisory Networks also reconsidered this draft list as they drew up implementation plans for the 2000 biennial proposal to the NSGCP. Comments from these individuals and groups, as well as those of NYSG staff, were combined and incorporated into a new list. The new list was distributed to the NYSG Program Advisory Council and the Board of Governors for consideration at September meetings of each group. A final chance to consider the list was given to NYSG staff at the November meeting. The final list included 3 Issues, the same as those in the NSGCP strategic plan, and 9 Goals. A draft rationale statement for the 'Seafood Safety' Goal also was prepared so that Extension specialists would have an example to facilitate information gathering for statements for the other Goals. This request was made of the Extension specialists in December and the rationale statements were completed in January of 2000.

The management team completed a draft strategic plan in early February of 2000. This was distributed to NYSG staff and the PAC. The draft was considered at meetings of each on April 4 and 5, respectively. Discussions of the NYSG staff and the PAC led to elimination of the third goal. Aquaculture was reduced in scope and, with development of improved seafood processing and products, was incorporated into Goal 1. Biotechnology was dropped as a goal because it is as methodology. After incorporation of other comments, the modified plan was distributed to the BOG. The plan was discussed thoroughly at the BOG meeting at Stony Brook on May 10, 2000. The final version, incorporating the BOG comments was completed and distributed to the Executive Committee for a conference call in June 2000 at which the final version of the plan was approved.

In summary, the NYSG plan was prepared with the help of NYSG staff, academic researchers, representatives of business, industry and agency stakeholders, and the BOG through much iteration. This plan is oriented around technical problems and opportunities for sustainable

coastal development. It fits into the NSGCP and NOAA strategic plans. It focuses on problems in New York State and the nation and will help provide policy and decision makers with the information that they need to support societal needs.

VIII. MOVING INTO THE FUTURE

Staffing and Positioning the Organization

As NYSG moves into the new millennium particular attention needs to be paid to where it is strategically positioned within the State of New York (its agencies, departments, legislature, etc.). How Sea Grant is linked into SUNY and Cornell and its relationship to the three Sea Grant regional programs that encompass or abut on the coastal region of New York, directly relates to the program's effectiveness within the state and regions. New York is a very diverse and complex state with an equally complex coastal area. Without a well thought through plan, NY Sea Grant will not "broaden its role as a purveyor of science-based information and a collaborative force toward wise management, economic development and conservation of New York's and the Nation's coastal assets."

New York, because of its unique location in the nation's coastal region, is a member of three Sea Grant regional programs. This gives NYSG a unique opportunity to participate in and take leadership in Sea Grant regional activities. Because of the importance of regional and national programming to Sea Grant nationally, NYSG will continue to maintain an active role in participation and leadership of the three Regional Sea Grant Networks with which it is associated.

The program will need to continue a statewide presence throughout the coastal region, allowing service to coastal audiences, where they are located. The Extension Program strongly supported by the research, education and communications programs has and will continue to provide this function. Having Sea Grant Extension (SGE) Offices strategically located throughout New York's diffuse coastal region, with specialists having programmatic specialties geared to the specific needs of that region, is an important part of serving NYSG's clientele needs. When possible, having more than one specialist per office, is the preferred style of operation for the SGE offices. This not only allows the program to reduce the administrative overhead for each specialist, but also allows for increased program coordination and collaboration among staff.

The majority of SGE offices are located on SUNY campuses in the coastal region, because of a programmatic desire to locate near Sea Grant researchers as well as stakeholders. The SUNY campuses provide space at no charge for the SGE specialists located on their campuses. It is necessary that SGE assess the mission and academic focus of the campuses and Extension Associations where the SGE offices are located at regular intervals to insure that both Sea Grant and the hosting institution are benefiting from the relationship. The SGE program needs also to look at all the Extension office locations to see that they are geographically covering the state, in the most effective way.

Action

Prior to 2004, NYSG will examine Extension staff expertise, total programmatic effort and office locations to insure Sea Grant Extension personnel are trained to provide education on current coastal issues, adequate extension effort is provided and the most effective mix of locations is found for staff members to carry out Extension programming, within the resources available for Outreach.

NYSG does not currently have adequate coverage in the major urban corner of the State. That corner is NYC where a high percentage of the state's population resides. Providing Sea Grant programming and office location in this densely populated urban area is a priority for this strategic plan. Opening new Extension offices is expensive for the program. A new office requires both infrastructure and administrative support. These costs can be reduced if individuals can be located cooperatively with another organization. This effort will take additional resources and new partnerships, but NYSG looks forward to initiating a new urban Sea Grant focus to the program. Attempts are currently being made to develop a relationship with EPA Region II to locate a NY-NJ Harbor Estuary specialist in their Manhattan office. Further efforts will be made to increase the NYSG total presence in New York City.

NYSG has had to re-evaluate its administrative staffing and services to organizations outside Sea Grant as a result of effective staff losses. Loss of a half-time Communications position has led to a decision to house all Communications staff at the Stony Brook offices. Concerted efforts by the staff to make upstate trips to communicate with and obtain leads for subject matter and media contacts from Extension staff and researchers have effectively provided service to the Great Lakes District. At the same time, the centralized location allows the reduced staff to work more effectively together. Funding of one project assistant and an administrative assistant is now covered by outside programs. This has resulted in effective loss of another half-time position at a time when the NSGCP is running more national competitions that the state programs are expected to support with distribution and peer review services. In addition, evaluation of the effectiveness of the state Sea Grant programs is increasingly based on outcomes of work. These are more difficult to quantify than numbers of attendees, etc. This has forced us to re-think our policy of providing free administrative services to non-Sea Grant organizations as long as the effort is within Sea Grant's mission.

In the future, NYSG will request funds to cover all or a good portion of the administrative expenses of managing programs for outside organizations. In addition, NYSG will continuously monitor the effectiveness of the centralized Communications group and the needs for administration and documentation of program success to decide when additional staff is needed.

Developing and maintaining active programmatic relationships with NYSG's state and federal partner agencies is an important and time-consuming activity. This requires that Extension

specialists and members of the management team actively serve on state and federal agency committees and proactively maintain relationships. These relationships are enhanced by having agency partners serve on the specialist's Program Advisory Networks and the Statewide Program Advisory Committees.

Action

Identify partnerships that can be developed or enhanced by having NYSG staff serve on additional committees or boards. The goal is for NYSG to better serve its user groups in the state, region and nation.

Raising the Resources

Raising adequate financial resources to maintain and grow the NYSG Program is a continuous effort that needs to be well conceived. This issue is compounded by the fact that salary increases, programmatic increases and other inflationary increases are not included in the core resources received from the NSGCP and the State Legislature. Therefore level funding in core funding translates into a decreased level of Sea Grant research, programming and administration. NYSG will work to increase the core state budget and to build required salary increases into the budget automatically

The SGE program has been fortunate to maintain the existing core staff the past five years with escalating salaries and very modest increases from the NSGCP (less than salary increases). Fortunately because of member item legislative awards that have increased the state budget to NYSG for the past two years, staff have not had to be reduced. Unfortunately, these increases are what the State calls "Member Items;" they are not guaranteed for future years. SGE staff are increasingly funded by targeted, outside sources of dollars from partnering relationships with federal and state agencies. It appears that in the year 2000, seven professional staff (6.5 FTEs) will be funded by outside grants and contracts (not from core dollars). This is out of a total Professional SGE staff (located throughout NY's coastal region) of 17 individuals. The other ten individuals, for the most part, also have percentages of salaries coming from other grant resources. It is apparent that future SGE program stability and growth will come from innovative partnering relationships with state, federal agencies and hopefully in the future, business and industry.

NYSG has dealt with this issue in a number of ways. One-third of all core dollars received from state and federal resources go to fund the Extension Program. This helps maintain a consistent percentage of the core program in research and outreach, even when salary and cost of living expenses for personnel have increased faster than core resources for the program. In past years this has required leaving Extension and Communications positions open, when vacated and forced reductions in staff on several occasions.

During the past three years NYSG has put a major effort into increasing resources from the State of New York into the program. Because the primary focus of NYSG is on the citizens of the

state, it makes sense that a greater percentage of the resources should come from the State Legislature. Members of the State Legislature have agreed, and for the past two years the state has contributed an additional $500,000 per year to carry out Sea Grant research and outreach within NY. NYSG will continue to seek increased levels of funding from the State of NY and attempt to have this funding built into the request from SUNY when it goes to the Governor for his budget request. The Management Team of NYSG is also attempting to get cost of living increases built into its appropriation from the state.

NYSG has been successful in attracting outside grants and contracts. As previously stated the SGE program will have six of its professional staff totally funded by outside grants and contracts in the near future. These grants are from federal and state granting agencies as well as special competitions within the NSGCP. Senior SGE specialists are expected to bring in about 25 percent of their salaries, through grants and contracts. These moneys are then used to support others in the Extension program. Grants and contracts play a key role in the ability to maintain a vibrant Sea Grant effort in NY, and will probably play an even greater role in the future.

Recently SGE set up an endowment, from donations, to be used for the restoration of the coastal environment by youth in Quogue Long Island. This technique will find a limited, but important use, to raise funds for specific and targeted programming efforts. Endowments will work in the NY coastal regions where the coastal clientele feel an extreme passion about a proposed Sea Grant program effort and have adequate financial resources to support their passion.

Funding the Sea Grant Program will continue to be a challenge and will require a continuous effort by all staff within the program, but especially program management. Relying on federal funding for the total Sea Grant effort, will not give NY the diverse and rich SG program it deserves. Creativity, partnerships and unique collaborations will be required to maintain the program into the next millennium.

Action

A task force will be formed, made up of SG staff, PAC members, and appointed outside expertise, to examine how funding, particularly from business and industry, can be increased for NY Sea Grant research and outreach activities. The goal is to increase funding to the NYSG Program by $50,000/yr for 5 years, starting in 2002.

NYSG Program Planning and Evaluation

Continuous program planning and evaluation is key to maintaining a NYSG program that is to serve its audiences within the state and the region. NYSG does a good job in this area, but could benefit from reexamination and attempts at improvement. It is an area where efforts to bring

about improvement within the program are currently taking place, and will be a focus of the program for the timeframe of this strategic plan.

Each NYSG Extension specialist is expected to create and maintain a Program Advisory Network (PAN) to provide guidance and focus in each specific programming area. Both the Great Lakes and the Marine District are expected to have regional Program Advisory Committees that are made up of selected members of the specialist's PANs. The specialist's PANs and the regional outreach PACs form the basis of the user group input for NYSG outreach efforts.

Each Sea Grant specialist develops a two-year plan of work, which now has at its basis, the NYSG Strategic Plan. The individual specialist's plans are integrated into the outreach plan for the Great Lakes or Marine region and then into the statewide SGE plan. Because the strategic plan has been developed with the continuous input from the Extension staff, it has become the basis for their two-year planning effort.

NY Sea Grant has a 20+ member Program Advisory Council that has been modified within the past year to be more reflective of the citizens, businesses and agencies within NY, that Sea Grant serves. This committee is made up of representatives of many of the coastal user groups throughout the state, some of whom have served of the PAN's for the Extension specialists, as well as a few research managers. This recently rejuvenated PAC for NYSG will be meeting as a group at least once a year. Program planning and evaluation is an important part of their overall function.

NYSG has ad hoc Technical Advisory Committees (TAC). The omnibus TAC is formed and meets every other year to review Sea Grant omnibus research proposals before they are included in the Omnibus request. The individuals on this committee change every two years, and all are respected scientists from outside of New York, that are experts within the programmatic parameters of the call for research proposals. Other TACs are organized whenever NYSG circulates an RFP. Members of each TAC use the mail peer reviews and their collective experience to assist the program in determining the scientific merit of proposals received by NYSG.

The Strategic Plan for NYSG lays out a number of goals and objectives that provide the framework for a meaningful evaluation of NYSG outreach and research efforts. This is the first time that both objectives and goals for NYSG research and outreach have shown up in the same planning document. The NYSG program has gone through a major self-evaluation process. The Strategic Plan and self-evaluation will be carried out with assistance from the specialists PAN's, the Marine and Great Lakes outreach PAC's, the NYSG PAC, the Board of Governors and for the most part by all Sea Grant staff members**.**

Action

By 2004 NYSG will identify techniques and processes to continuously evaluate and document NY Sea Grant programmatic accomplishments.

IX. THE NEXT STEPS

In order to proceed towards accomplishing its nine goals, NYSG will next develop specific action (or implementation) plans to support each of them. With input from advisory committees, implementation plans will be developed on a two-year basis coincident with development of our biennial proposal to the NSGCP for our federal award to guide operations during the upcoming biennium and lay the groundwork for activities during the next biennium. As part of these plans, approaches and activities will be prioritized based on perceived needs and available resources. Through the development of this Strategic Plan to guide New York Sea Grant's planning on a six-year basis, and implementation plans to guide operations on a two year time scale, NYSG hopes to chart a clear course for where it wants to go, yet maintain the flexibility to respond to changing conditions and opportunities in support of the wise use of New York's and the nation's coastal resources.