

New Jersey
Sea Grant
College Program

STRATEGIC PLAN

A Vision
for the
Twenty-first Century

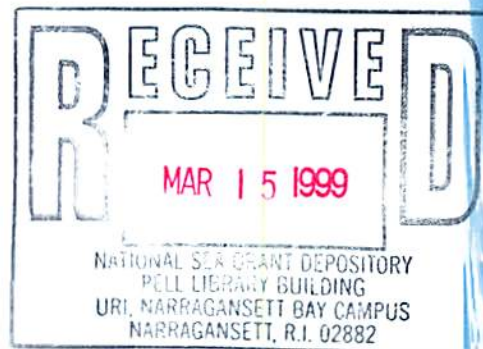


30th YEAR ANNIVERSARY
1969-1999



A Vision for the Twenty-First Century

STRATEGIC PLAN



New Jersey Sea Grant
College Program

New Jersey Marine Sciences Consortium
Sandy Hook Field Station, Building #22
Fort Hancock, NJ 07732
Phone: (732) 872-1300
FAX: (732) 872-9573
<http://www.njmsc.org>



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Vision Statement

The New Jersey Marine Sciences Consortium and its *New Jersey Sea Grant College Program* aspire to make a positive difference in New Jersey and the region by improving science literacy among all citizens, by contributing solutions to coastal issues, and by promoting sustainability through balanced economic growth and environmental stewardship.

Background

Sustainable development must balance economic growth with environmental stewardship. The New Jersey Marine Sciences Consortium (NJMSC), and its *New Jersey Sea Grant College Program* are committed to the national vision of sustainability and wise use of our nation's coastal resources that provide the basis of a strong coastal economy.

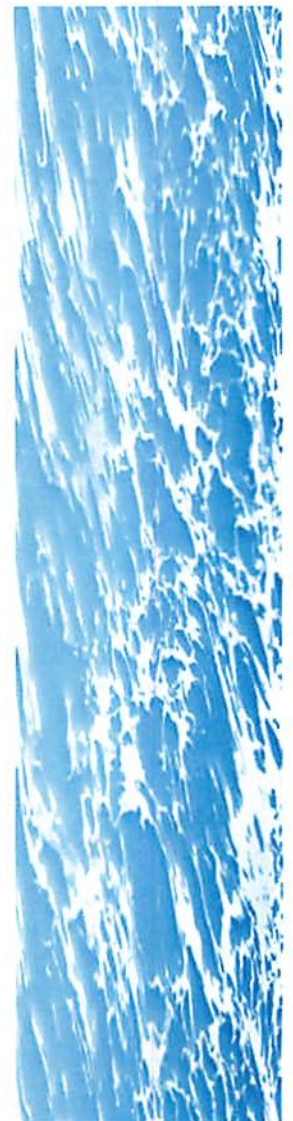
NJMSC, and the *New Jersey Sea Grant College Program*, promote marine research, education, and outreach by:

- ✓ Providing research opportunities for its 29 member institutions;
- ✓ Providing training for *all* students interested in marine science;
- ✓ Teaching undergraduate/graduate courses;
- ✓ Teaching pre-college (K-12) and public awareness and outreach programs;
- ✓ Establishing partnerships with the private sector and resource agencies;
- ✓ Offering shipboard platforms and laboratory space;
- ✓ Offering common facilities, vessels, and equipment for sponsored research.

NJMSC seeks to provide *equal opportunity* for all regional faculty and students interested in the marine environment. Through the *New Jersey Sea Grant College Program*, NJMSC seeks collaborative, multi-institutional efforts for resolution of coastal issues. It builds bridges between industry and academe, between government and academe, and between member institution research laboratories and those in management needing reliable information for decision making. With access to the National Sea Grant

"The very real danger is that environmental degradation may be moving faster than our current institutions (or technology) respond, with widespread and potentially irreversible consequences for coastal environments."

— Baird, 1996



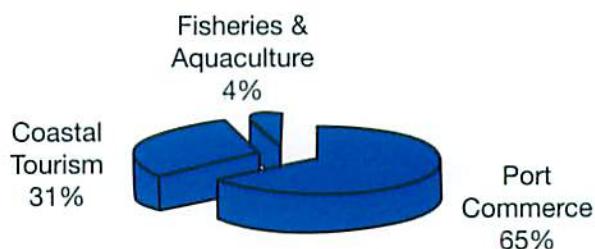
network, NJMSC is an important source of information for users in the region. The strength of NJMSC is manifested in the many cost-share partnerships that fund its marine and environmental science programs.

The Coastal Economy of New Jersey

More than 80% of New Jersey's counties border on estuarine or oceanic waters. Eighteen percent of New Jersey's land area is coastal, ranking it fifth in the nation. Large water bodies include the highly urbanized New York-New Jersey Harbor Estuary, Barnegat Bay and Delaware Bay. *Although New Jersey is the fourth smallest state, it is the most densely populated, and the New York and New Jersey metropolitan area is one of the most highly urbanized and industrialized regions of the nation.* The health of New Jersey coastal waters is coupled tightly to watershed management issues that relate to demographics and point and non-point source contaminant inputs. New Jersey's coastal economy is integral to its sustained economic development:

- ✓ Port commerce supports a \$29 billion industry;
- ✓ Coastal tourism is a \$14 billion industry;

New Jersey Coastal Economy



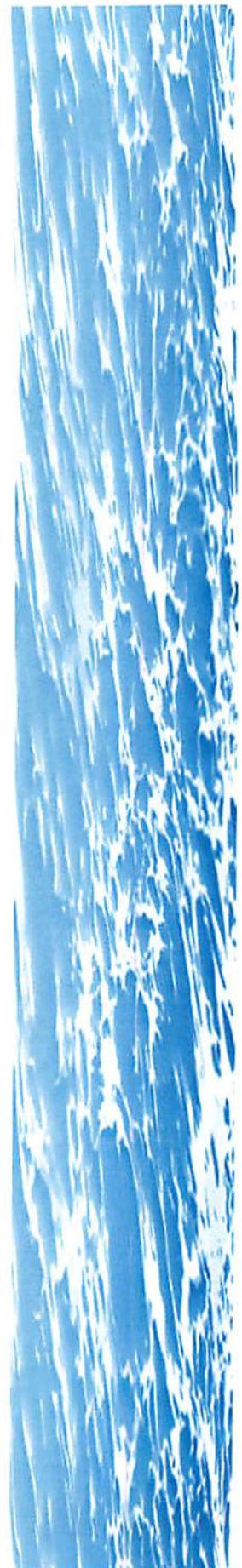
- ✓ Fishery and aquaculture industries are valued at over \$2 billion.

New Jersey's number one economic sector, the pharmaceutical industry, also has substantial interest in products from the sea associated with a growing biotechnology infrastructure. The New Jersey Commission on Science and Technology estimates that over 125 companies ranging from the small entrepreneurial development firms to large pharmaceutical firms are active in biotechnology. The New Jersey Business and Industry Association (NJBIA) estimates that New Jersey ranks in the top three states in the field of biotechnology. Among the six states that account for half the nation's R&D expenditures, New Jersey ranks fifth with over \$9 billion invested. Marine biotechnology is a priority area for the *New Jersey Sea Grant College Program*.

In this densely populated region, human uses are integrated into a striking mosaic with natural systems:

- ✓ The Delaware Estuary is currently experiencing the largest wetland restoration project of its kind ever attempted in the United States, side-by-side with the greatest number of oil refineries on the east coast;
- ✓ One of the largest migratory shorebird concentrations in the world visits the shores of the this region, giving rise to a \$31 million dollar a year ecotourism industry;
- ✓ More than 127 miles of microtidal coastline on the Atlantic coast are characterized by extensive beaches and barrier island complexes. These locations are the cornerstone of New Jersey's coastal tourism industry (within a two-hour drive of 30 percent of the United States population), yet one can find major wildlife refuges, a wild and scenic river system, and an estuarine reserve within easy commuting distance of Atlantic City and Philadelphia;
- ✓ Coastal bays and estuaries of New Jersey are part of a statewide system of critical nursery and rearing areas for finfish and shellfish important to both commercial and recreational fishermen.

The state's estuaries and wetlands also act as a natural buffer against storm and flood damage. Storm damage





is of major concern in New Jersey's coastal communities, particularly as a result of recent events. Various citizen groups and public/private partnerships were formed as a result of recent storms to address the issue of coastal storm damage and coastal sustainable economic development.

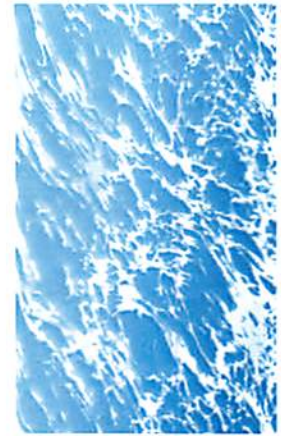
New Jersey, therefore, is a state endowed with a rich array of both coastal and marine resources, and the value of industries they support is extraordinary, totaling more than \$45 billion dollars, and employing more than 500,000 people. This large diversity of economic and natural resources, contained within the nation's most densely populated state, creates intense competition for coastal lands, waters and resources. Relatively undisturbed regions such as Barnegat Bay are under increasing pressure from development and other anthropogenic impacts. Along with traditional uses, is the resurgence of much of New Jersey's urban waterfront for living space. Rapid growth of year-round resident tourist populations requires New Jersey's coastal communities to face enormous pressures, balancing growth demand within the protection of its marine and coastal resources. New Jersey's coastline is largely "built" making human safety and coastal hazard mitigation an area of increasing importance to New Jersey.

This brief summary provides the general rationale for the *New Jersey Sea Grant College Program's* emphasis and priorities, and defines its program of research, extension service, education and outreach, and communications. New Jersey's strong economic growth, particularly in marine biotechnology, coastal tourism and aquaculture, provides unique opportunities to build a stronger *New Jersey Sea Grant College Program*. Similar opportunities exist for partnerships with other industries, academe and government to address relevant user needs and viable coastal economic development, while improving the health of our coastal ecosystems.

Strategic Goals and Objectives

New Jersey Sea Grant College Program activities involve more than 40 percent of its member institutions. Areas of specific interest to the *New Jersey Sea Grant College Program* include: ecosystems research, environmental models, coastal zone management, marine technology, marine biotechnology, fisheries and aquaculture, socioeconomic and legal studies, education, communications, and advisory services. More specifically, the projects of the *New Jersey Sea Grant College Program* focus on:

- ✓ Developing scientific information essential for the wise management, conservation, and utilization of coastal resources;
- ✓ Providing solution-oriented, multidisciplinary integrated research to address marine-related issues of importance in New Jersey, the mid-Atlantic region, or nationally;
- ✓ Facilitating technology transfer of research to product development, resource management, or decision-making;
- ✓ Heightening public awareness of the need to conserve and properly manage marine resources;
- ✓ Providing marine related education programs for college and pre-college audiences, members of coastal user groups, and other interested parties;
- ✓ Providing modern training in marine sciences for pre-college teachers through short courses, field experience, and in-service training.



Strategic Goal One

Maximize contributions of Member Institutions in support of a sustainable New Jersey coastal environment. Without sacrificing academic freedom and basic research, the program will focus on relevant, problem oriented studies, whose outcomes and products reach to the broadest number of constituents available.

Long-term Strategic Objectives

- Understanding the biological, chemical, and physical properties of the ocean through innovative, basic, and applied research;
- Developing applicable solutions for marine hazards; chemical, biological, or physical;
- Enhancing marine technology research and development that will lead to new products and growth in the marine sector;
- Increasing the marketable and recreational supply of marine and estuarine living resources and industrial/recreational use of the ocean;
- Strengthening and supporting education programs related to marine and estuarine resources.





Strategic Goal Two

Identify relevant New Jersey coastal issues and seek a balanced and objective response through research, education and outreach to address them.



To accomplish these goals and objectives, NJMSC focuses its activities on:

- ✓ Matching the national science agenda with local knowledge, skills and priorities;
- ✓ Addressing social, cultural, and economic management issues;
- ✓ Planning a research agenda built on the needs of the marine industry, government, resource managers and the public;
- ✓ Broadening the public knowledge through a wide-range of marine-related basic and applied research in New Jersey and the mid-Atlantic region.

Sea Grant Advisory Board (SGAB)

Since its inception, NJMSC has functioned as an alliance conducting its affairs through interrelationships with academic, public, and private entities. To strengthen ties between the Research and user communities, the *New Jersey Sea Grant College Program* convenes a Sea Grant Advisory Board (SGAB). The primary responsibility of the Board is to provide advice to management and staff in all matters related to the *New Jersey Sea Grant College Program*. This advice encompasses the local perspective on coastal issues, program review and policy development by:

- ✓ Commenting on the orientation and progress of the *New Jersey Sea Grant College Program* in context of changing needs and priorities, program balance, initiatives and new directions;
- ✓ Reviewing pre-proposals and proposals;
- ✓ Holding discussions with the *New Jersey Sea Grant College Program* Director from the perspective of user groups in each major program area;
- ✓ Assisting the *New Jersey Sea Grant College Program* office in identifying and encouraging participation of appropriate talent in the program;
- ✓ Providing comments to the *New Jersey Sea Grant College Program* applicable to solving problems considered critical to New Jersey's marine-related economy and more broadly, to regional and national needs.

SGAB members represent a balanced cross-section of New Jersey's user community: marine industries, utilities, and federal, state and local governmental agencies representing:

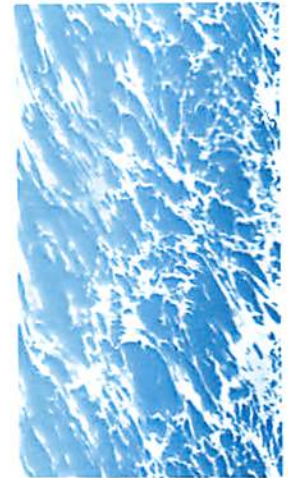
1. Aquaculture
2. Biotechnology
3. Coastal zone management
4. Commercial fishing
5. Environmental advocacy
6. Marine trades
7. Maritime industry
8. Petrochemical industry
9. Pharmaceutical industry
10. Policy and planning commissions
11. Private citizens
12. Recreational fishing
13. Regulatory/resource agencies
14. Shore tourism

Scientific Advisory Committee (SAC)

The Scientific Advisory Committee consists of experienced senior scientists from the region, but outside of New Jersey, with expertise in the following:

1. Aquatic ecology
2. Sediment/dredging
3. Fish and shellfish aquaculture
4. Biotechnology
5. Education
6. Biogeochemical cycling
7. Shore process and coastal engineering
8. Environmental chemistry
9. Ecological engineering
10. Social, policy and economic sciences

The SAC provides technical advice and ranking of proposals (or pre-proposals). Working interactively, the SAC and SGAB recommend a "slate" of relevant and technically meritorious proposals to the Sea Grant Director for potential funding.



Strategic Goal Three

Increase science literacy in New Jersey, and educate New Jersey citizens to the need for balancing sustained economic growth with environmental stewardship.





Strategic Goal Four

Develop Sea Grant Extension Program (SGEP) services to support research, education, and technology transfers in the areas of ecosystem and watershed management, socioeconomic and legal policy development, conflict resolution, contaminant reduction, dredged materials management, habitat restoration, point and non-point pollution, harmful algal blooms, coastal erosion and hazard mitigation, fisheries technology, aquaculture, and marine biotechnology.



Sea Grant Extension Program (SGEP)

The economic importance of New Jersey's coastal margin has subjected it to increasing development pressures over the past several decades. This trend is expected to continue well into the next century. The high economic value of coastal land in the developed state creates tremendous resistance in New Jersey, particularly at state and/or local levels, to alternative, more environmentally attractive uses. Development has led to human-induced perturbations such as eutrophication, habitat alteration and stressed ecosystems. It is nowhere more true than in coastal areas that science-based management decisions and effective public policy are absolutely critical to both ensuring human health and preserving ecological systems in a state that will not preclude or severely reduce their productive use (Baird 1996).

To a large degree, New Jersey's coastal economy rests on ports commerce, coastal tourism, and fisheries/aquaculture. Together, these economic sectors generate nearly \$50 billion in annual revenues. The state has adopted a watershed management approach to controlling point and non-point source pollution (including atmospheric deposition), reducing contaminant loads and improving water/sediment quality in coastal bays and estuaries, and restoring habitats. The *New Jersey Sea Grant College Program* has been in the forefront of research, education and outreach in contaminant reduction, fisheries research, coastal engineering, hazard mitigation, environmental modeling, and has developed a working partnership with the New Jersey Department of Environmental Protection (NJDEP), Coast Zone Management, Department of Commerce, state legislators, and the private sector. To the extent practicable, the Sea Grant Marine Extension Program should operate in a *balanced capacity* to address New Jersey's coastal issues, and promote technology transfer and job creation.

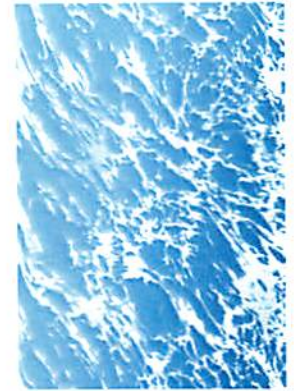
New Jersey Sea Grant Communications

New Jersey Sea Grant Communications will support the mission of the New Jersey Marine Sciences Consortium and its *New Jersey Sea Grant College Program* by providing reliable, useful information based on sound science, and deliver it to the public. This, in turn, will increase marine science literacy in New Jersey and work toward the goals of the National Sea Grant Program's Strategic Plan for 1998 to 2005, which lists Education and Human Resources as one of the plan's three key elements.

New Jersey Sea Grant Communications will utilize all available means and media, including print, radio, television, video and computer technology, to create products and provide comprehensive services to the New Jersey Marine Sciences Consortium and its *New Jersey Sea Grant College Program*.

Sea Grant Communications Strategic Objectives

- Improve communications and support services for Sea Grant Extension programs;
- Increase the number of media contacts and facilitate transfer of information to the National Sea Grant Media Relations Office;
- Work with Program Management to institute a strategy for keeping state and federal legislators and managers updated about the program and marine and coastal issues affecting New Jersey and the region;
- Increase participation in Sea Grant regional and private partnerships for greater visibility and an opportunity to produce high-quality resource products;
- Make maximum use of computer technology by enhancing program visibility and improving information access via the Internet and the World Wide Web.



Strategic Goal Five

Forge strong ties with civic leaders, legislators, the media, and the public to ensure continued public support for marine science research and education.



"More effective communication will ultimately create greater awareness of Sea Grant research and SGE activities, and subsequently promote the wise use and stewardship of marine and coastal resources on both a regional and national level."

*— Dr. Michael Weinstein
President, NJS
Director, NJ Sea Grant
College Program*



New Jersey Sea Grant Education

It is impossible to overstate the importance of marine and environmental science education in overcoming our well-documented state and national science education shortfall.

Strategic Goal Six

Develop and implement education programs that reach broad audiences and that contribute to science literacy and informed decision-making among all New Jersey citizens.

Marine and related environmental science education at all age and grade levels not only promotes resource awareness and environmental stewardship but can be a significant asset in achieving greater science literacy in students and adults. The long-term goal of New Jersey Sea Grant Education is to enhance its services to support state and national initiatives to improve science and technology education while promoting marine and environmental awareness and stewardship.

The Sea Grant Education Program at the NJMSC currently offers undergraduate and graduate courses as well as pre-college, professional educator and public programs that promote marine science education. Pre-college programs, known collectively as *The Coastal Experience*, serve more than 10,000 participants each year. Students and teachers from school districts throughout the state as well as members of organized youth, adult and civic organizations participate "hands-on" in NJMSC instructor-led field and classroom investigations of barrier beach and salt marsh environments. Professional Development workshops are offered that model best teaching practices. *The Coastal Experience* has been aligned to state and national Core Content Standards to support New Jersey's efforts in education reform.

Goals of the NJMSC Sea Grant Education Program are as follow:

- ✓ Develop and deliver marine education programs to college and pre-college audiences, educators, and other interested parties;
- ✓ Develop and deliver marine education programs to increase public awareness of our marine resources and the need to conserve and manage them;
- ✓ Strengthen and support programs of the NJMSC and the *New Jersey Sea Grant College Program* by integrating appropriate education and outreach components.



These goals guide the Pre-College and College Education Program both in content and inspiration. Current and future Sea Grant Education Program education activities are planned in concert with the National Sea Grant long-range education plan to:

- ✓ Contribute to the development of a more scientifically-literate citizenry who possess the skills and knowledge to make informed decisions and bring about desirable change;
- ✓ Improve the environmental ethic of our populace;
- ✓ Better educate and train pre-college teachers in science, mathematics, and technology.

As future programs unfold, they will be directed towards:

- ✓ Improved student performance in the sciences and strengthening the pool of students attracted to and retained in graduate and undergraduate studies in science and engineering;
- ✓ Increased participation of women and minorities in science and engineering;
- ✓ Developing, improving, and disseminating relevant curricula and providing educators with effective teaching tools; and
- ✓ Encouraging partnerships with other groups, including corporate entities, to further marine science education.

Program Development Funds

Program Development funds are essential for program flexibility. Development grants and development funds allocated to investigators at NJMSC member institutions are used for a variety of purposes, but primarily to support preliminary investigations and background work leading to full research proposals to the *New Jersey Sea Grant College Program* or other competitive grants program. Other funding opportunities include planning and development of interdisciplinary initiatives, development of innovative education and outreach initiatives, assembling scientists to address emergency situations, or developing state-of-the-art conferences.



Strategic Goal Seven

To engage New Jersey Sea Grant Education as a resource partner in support of education reform initiatives in New Jersey and the region.





Program Approach

The National Sea Grant Program publishes priority research categories in its Annual Program Guidance, and has developed a National Sea Grant College Program Strategic Plan. The intent of these documents is to provide uniformity within the National Sea Grant Network and to encourage multidisciplinary regional approaches.

The *New Jersey Sea Grant College Program* supports national Sea Grant activities in the following areas:

- Ecosystems Research
- Environmental Models
- Coastal Zone Management
- Marine Technology Research and Development
- Biotechnology
- Fisheries and Aquaculture
- Socioeconomic and Legal Studies

Strategic Goal Eight

Expand New Jersey Sea Grant College Program capabilities through local and regional private sector, municipal, and government partnerships.

With the approach of the twenty-first century, emphasis on global commerce and the shifting priorities in the national economy, the basic precepts of marine research, education and advisory services is needed more today than when NJMSC first introduced the *New Jersey Sea Grant College Program* to the State of New Jersey. In New Jersey, the value of the Sea Grant College Program grew steadily by directing attention to the changes, challenges, and opportunities represented by the state's extensive and invaluable marine and coastal resources and sustainable economy. To achieve its strategic goals through NJMSC, the *New Jersey Sea Grant College Program* continues to reach outward to all state institutions, industry, conservation organizations, research functions, and the public to identify issues of concern.



Partnerships

In terms of federal funding, the *New Jersey Sea Grant College Program* is among the smallest in the nation. Coastal issues in New Jersey, however, are no less prominent than in other Sea Grant states and alternatives are constantly sought to supplement federal funds with local partnerships.

In addition to expanding the overall pool of dollars, this strategy enhances the probability that sufficient funds will be available to support large-scale multidisciplinary projects. In recent years, the New Jersey Sea Grant College program has increased its core funding by more than 40% in local and regional partnerships.

Marsh Ecology Research Program (MERP)

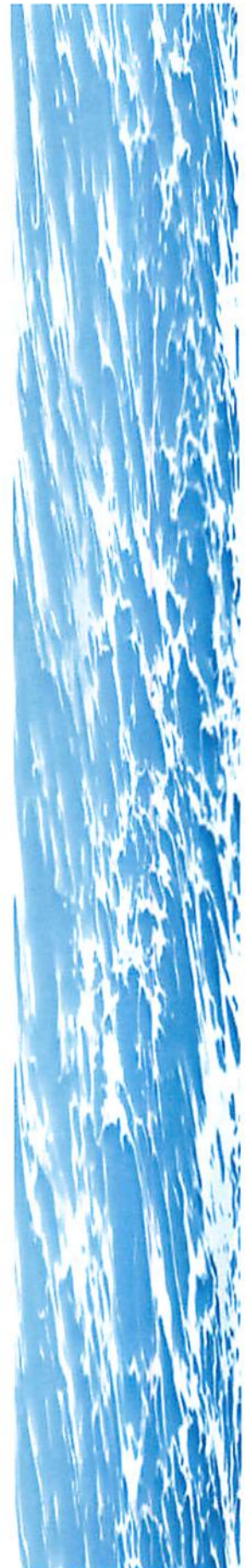
A unique collaboration has developed among the *New Jersey Sea Grant College Program*, other regional Sea Grant institutions, the Academy of Natural Sciences of Philadelphia (MERP Coordinator) and the private sector to co-fund basic and applied research in coastal salt marsh habitats. One of the largest wetland projects of its kind in the world, more than 4,050 hectares of degraded salt marshes are being restored on Delaware Bay. A vast natural laboratory, these wetland sites offer outstanding opportunities to advance our understanding of coastal wetland processes and restoration ecology. The MERP peer review process is rigorous and is virtually identical to that conducted by the *New Jersey Sea Grant College Program*. As part of its Strategic Plan, the *New Jersey Sea Grant College Program* will attempt to sustain the MERP over a 10-year period.

Research Priorities

The research priorities of the *New Jersey Sea Grant College Program* are both consistent with, and complementary to National Sea Grant College Program's Strategic Plan. Seven relevant areas of research have been identified to meet the long-range needs of New Jersey and the region: ecosystem research, environmental models, coastal zone management, marine technology and development, biotechnology, fisheries and aquaculture, and socioeconomic and legal studies.

Ecosystem Research

The estuaries of New Jersey are important sources of finfish and shellfish, as well as the providers of jobs and recreation to an ever-increasing regional population.





During this century, New Jersey's watersheds and estuaries have been subjected to tremendous development pressures, both industrial and residential. Pollutants in the form of toxic chemicals, pathogens, and nutrients, from a variety of point and non-point sources, have threatened the vitality and quality of local marine ecosystems and marine organisms, and have impaired use of these resources by the public. These pollutants degrade the marine environment and result in adverse health effects, ecological damage, and economic impacts. Consequently, research into watershed dynamics, fate and transport of pollutants, processes, and impacts remains a priority for the *New Jersey Sea Grant College Program*. Future Sea Grant ecosystems research will continue to provide data useful for management of the state's estuarine resources in light of the many competing, and often conflicting, uses they are subjected to. Program goals and objectives for New Jersey Sea Grant in Ecosystem Research include the following:

- ✓ Understanding the source, nature, amount and fate of pollutants (multiple stressors) in New Jersey estuarine systems and their impacts on the environment and its living resources;
- ✓ Understanding the sources, fates, and effects of nutrients entering the marine environment as a result of human activities;
- ✓ Understanding the sources, fates, and effects on aquatic organisms of pathogens and nuisance species that are introduced or influenced by human activities;
- ✓ Determining the impacts of heavy metals, chlorinated hydrocarbons, and other toxic pollutants on human users, residents, and marine plants and animals of coastal ecosystems;
- ✓ Documenting trends in the status of marine ecosystems, including changes in abundance and distribution of organisms;
- ✓ Assessing the impacts of human use and management practices on living marine resources;
- ✓ Understanding the effects of losing or modifying marine habitats as a result of human activities;
- ✓ Promoting pollution prevention technologies and strategies that protect coastal resources from catastrophic spills, point sources, and non-point sources;
- ✓ Assessing alternatives available to public administrators in order to effect constructive change.

Coastal Zone Management

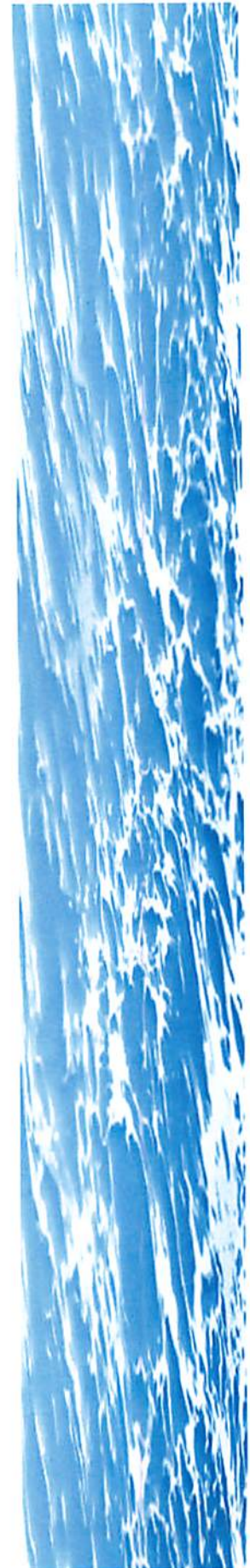
New Jersey's inlets, back bays, passages and thoroughfares, barrier beaches, and other coastal features are environmentally, economically, and culturally important. New Jersey has nearly 200 kilometers (127 miles) of beaches, most on fragile barrier islands. However, relatively few of the state's beaches have been spared indiscriminate, haphazard development which pose severe problems for coastal managers and barrier beach stability.

The Intracoastal Waterway comprises part of the back barrier areas of central and southern New Jersey, and provides a vital waterborne link to adjacent states. Its waterways are among the most heavily trafficked in the nation. Its shoreline is subjected to intense development pressure.

Because of the fragile nature of barrier islands and back bay areas, they are susceptible to the forces of nature. Coastal hazards caused by hurricanes, northeasters, or other coastal storms annually cause millions of dollars of damage to coastal businesses and communities. In addition, sediment shoaling of inlets, back bays, and other coastal waterways interferes with coastal navigation.

New Jersey Sea Grant College Program goals and objectives in Coastal Zone Management include the following:

- ✓ Developing a better understanding of coastal sediment transport and shoreline stability and how they are impacted by natural processes and hazards;
- ✓ Developing the knowledge and methods needed to assist in the management and preservation of New Jersey's coastal systems;
- ✓ Developing a predictive capability for coastal systems behavior as a consequence of systems dynamics under natural conditions and human intervention;
- ✓ Determining the social, economic, and governmental factors and interrelationships that affect the New Jersey coastal systems and their management, and devising ways of alleviating hazards to coastal residents and users.





Environmental Models

The complex nature of current marine environmental issues requesting research extends beyond traditional, descriptive studies of local ecosystems. Investigations must focus on fundamental ecological processes that regulate ecosystem structure and function, and the response of ecosystems to natural variability and anthropogenic change. Appropriate management decisions related to coastal resources and coastal zone issues not only require quantitative understanding of the processes involved but also demand accurate models for predicting the impacts of natural and man-made changes.

New Jersey Sea Grant College Program goals and objectives for Environmental Models include the following:

- ✓ Developing techniques for enhanced coastal environmental prediction;
- ✓ Developing detailed, quantitative methods enabling a better understanding of ecosystem response to natural variability and anthropogenic change;
- ✓ Developing time-dependent dynamical models that predict physical changes to nearshore environments;
- ✓ Developing techniques that advance fishery forecasts and ecosystem modeling technology.

Marine Technology Research and Development

The *New Jersey Sea Grant College Program* continues to seek improvement in state-of-the-art marine technology and engineering to solve problems as opportunities arise from the specific needs of New Jersey and the region. This focus on marine technology and engineering is fostered by the special competence and facilities offered by a number of NJMSC's member institutions.

Over the years, Research and Development projects concerning improved methods and technologies for beach erosion control and ocean engineering and are included in the Marine Technology Research and Development program.

Program goals and objectives for the *New Jersey Sea Grant College Program* in Marine Technology Research and Development include the following:

- ✓ Encouraging the concept, design, and execution of innovative and demonstrably useful ocean engineering projects;
- ✓ Increasing productivity or capacity, increasing process capability, improving reliability, and conserving critical materials in maritime industries;
- ✓ Devising ocean application for new materials and novel processes and coatings;
- ✓ Designing and testing the integrity and effectiveness of improved erosion control structures and techniques.





Biotechnology

New Jersey is home to more than 175 companies who are active in research and development in the biotechnology field. Many of the products generated by these firms are household names and are constantly being improved as new technology emerges.

New Jersey Sea Grant College Program Biotechnology goals and objectives are to:

- ✓ Develop new pharmaceutical products from living marine sources;
- ✓ Develop new bioremediation methodologies to eliminate toxic and other chemical pollutants both in the marine and nonmarine environment;
- ✓ Improve living resource productivity and crop yields by means of new technologies in aquaculture. Included in this priority is the development of hybrid or other species of marine living organisms that have been environmentally stressed or have been reduced because of serious disease;
- ✓ Improve identification of different species of marine organisms through new methods of biotechnology including molecular probes;
- ✓ Exploit the unlimited possibilities that marine and aquatic organisms have for protecting public health, for restoring degraded ecosystems, for improving seafood production and safety, and for developing new products;
- ✓ Develop new biotechnological approaches to enhance the quality and survivability of living marine resources.

Fisheries and Aquaculture

New Jersey's fishery resources are an important element of the state's economy. Each year, the state's commercial fisheries rank among the most productive on the East Coast and in the nation. In addition, New Jersey recreational fisheries are among the nation's leaders in terms of angler expenditures, revenue generated, and angler participation.


The *New Jersey Sea Grant College Program* conducts research in fisheries to assist managers with the development and conservation of these resources. Program goals and objectives for New Jersey Sea Grant in Fisheries include the following:

- ✓ Achievement of the full economic, social, and environmental potential of the New Jersey commercial and recreational fisheries;
- ✓ Understanding the systems that constitute the New Jersey marine fisheries and to define their interrelationships;
- ✓ Assisting with improvements in fishery management, including efforts to rebuild overfished marine fisheries, efforts to maintain currently productive fisheries, and efforts to protect and enhance fisheries habitat.

The demand for fish and seafood products in the United States has risen recently as a result of increasing public awareness of the nutritional and health benefits of eating seafood. This demand comes, unfortunately, at a time when many traditional fishery resources are being harvested at, or near, sustainable yields. As a result, aquaculture has emerged as a growing industry during the past decade. Although some species have proven to be economically feasible to raise in New Jersey, much work remains to facilitate development of commercial-scale venture. Program goals and objectives for New Jersey Sea Grant in Aquaculture include the following:

- ✓ Reducing impediments to aquaculture businesses;
- ✓ Improving the profitability of aquaculture systems;
- ✓ Improving the quality and efficiency of natural and artificial aquaculture feeds;
- ✓ Developing methods to control major disease-related mortalities in culture systems.





Socioeconomic and Legal Studies

Human and policy dimensions of coastal resource management are of growing importance because of increasing recognition of the need for sociocultural data. In order to provide relevant information for the wise use of New Jersey's coastal and marine resources, New Jersey Sea Grant is interested in studies that involve collection and analysis of appropriate socioeconomic and policy-related data and information, analysis of social change, analysis of natural resource management options, suggestions for alternative institutional arrangements, socioeconomic impact studies, and identification of legal and policy constraints to the development of coastal businesses. Program goals and objectives for the *New Jersey Sea Grant College Program* related to Socioeconomics include the following:

- ✓ Developing socioeconomic data on the New Jersey shore as an essential component of the state's economy;
- ✓ Enhancing the economic viability within the shore area, including assisting with improving the productivity and longevity of firms in vulnerable sectors of coastal business;
- ✓ Promoting and enhancing ample and high-quality water-based and associated terrestrial-based recreational opportunities with sustained availability for public use;
- ✓ Fostering a complete understanding of considerations affecting the region's estuarine and ocean resources and their management;
- ✓ Encouraging activities which may promote enhancement and preservation of estuarine resources and uses;
- ✓ Creating new coastal tourism opportunities and enhancing existing businesses;
- ✓ Assisting with conflict resolution and management of competing uses;
- ✓ Providing information useful for management and protection of New Jersey's ocean and bay waters and the living components of the marine environment;
- ✓ Addressing critical natural resource management and pollution control issues.

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