

MASGC STRATEGIC PLAN 2000-2005

From the Director

The Strategic Plan of the Mississippi-Alabama Sea Grant Consortium (MASGC) for the 2000-2005 period presents an exciting new vision for the organization. It is anticipated that this vision will elicit a new level of partnering and buy-in not only from its member institutions but from federal, state, and other agencies and donors throughout Mississippi, Alabama, the Gulf region, and the Nation.

MASGC was created as the first bistate Sea Grant program in the nation. MASGC is also unique in being the largest "membership" Sea Grant in the country. Coordinated by a central administrative unit in Ocean Springs, Mississippi, the Consortium's eight marine science institutions serve a bistate region of over 100,000 square miles. The current composition of the Mississippi-Alabama Sea Grant Consortium includes Auburn University, Dauphin Island Sea Lab, Mississippi State University, The University of Alabama, The University of Alabama at Birmingham, The University of Mississippi, The University of Southern Mississippi, and the University of South Alabama.

The consortium concept has distinct advantages and disadvantages. Coordinating such a diverse group is a major challenge; however, as the marine science agenda has switched in recent years towards examination of the environmental threats to large marine ecosystems such as the Gulf of Mexico, the consortium model offers many unique opportunities.

A strategic plan is a "living document" to be revisited and revised on a regular basis throughout the planning period. We have initiated a "seamless" planning process where the overall goals of the strategic plan are divided into priorities for each year in an annual Implementation Plan. Our annual reports from 2000 onwards will track our progress in meeting both the annual priorities and strategic goals we have set for our organization.

By its extraordinary accomplishments over the past 30 years, MASGC has demonstrated that the

rewards of the consortium concept are numerous—but only if the vision, energy, enthusiasm, and cooperation are present.

We encourage you to engage with us as we realize the vision contained in this plan which will hopefully set the tone for our collaborative activities and help redefine MASGC as one of the premier Sea Grant programs in the Nation.

Executive Summary

A recently submitted report, *Turning to the Sea: America's Ocean Future*, echoes this extremely important opportunity, by providing broad recommendations to the President of the United States concerning our nation's diverse, and sometimes competing, interests along our coasts. Clearly, a national awareness of marine resource utilization and conservation and how our oceans influence us on a daily basis requires a greater public understanding of the oceans.

To that end, the National Sea Grant Network plays a unique role in having the only federally-funded program expressly formed to engage the scientific community in an integrated program of marine research, education, and outreach. Through its network of Sea Grant programs in coastal and Great Lakes states, the National Sea Grant Network sponsors and facilitates marine research with the goals of identifying marine science challenges and opportunities that have specific local concerns. The Mississippi-Alabama Sea Grant Consortium (MASGC), one of only two bistate, multi-university Sea Grant programs, is a National Sea Grant Network participant with a specific focus on marine resources in Mississippi and Alabama coastal regions, and the entire northern Gulf of Mexico region.

MASGC has initiated a strategic planning process for the years 2000 to 2005 in order to determine the topics of importance to its marine constituencies and to meet the broad challenges of this new century.

MASGC sees the development of this strategic planning document as the first step in a new planning process for a revitalized organization. This Strategic Plan is not an end point, but a new beginning wherein realistic goals and objectives are outlined, implementation plans are designed, and evaluations of the implementation results are examined to determine if the original strategic goals need revision.

History of the Consortium

The Mississippi Universities Marine Center was established in June 1969 as a mechanism for coordinating ocean-related research and education for Mississippi institutions of higher learning. The Center was designated as the action arm of a consortium formed originally by the Gulf Coast Research Laboratory, Mississippi State University, The University of Mississippi and The University of Southern Mississippi. The Mississippi Universities Marine Center soon evolved into the Mississippi Sea Grant Consortium.

Similarities of terrain, hydrography, population, coastal industries, and a common sociological heritage suggested that a bistate Sea Grant program with Alabama be developed. This program could draw upon the resources of Mississippi and Alabama and would be directed at solving problems common to both states. Accordingly, several higher education institutions in the state of Alabama, through their Marine Environmental Sciences Consortium, joined with the Mississippi Sea Grant Consortium. In June 1972, this new partnership established the Mississippi-Alabama Sea Grant Consortium, the first bistate Sea Grant program in the nation.

In recognition of the development of a nationally-recognized program of research, education, and outreach, the National Sea Grant College Program elevated the Consortium to institutional status in 1979. After continued improvements, increased program activities, and funding support from member institutions, Secretary of State Malcolm Baldrige in 1982 acknowledged MASGC's excellence by designating it as a Sea Grant College Program.

MASGC investments in research, education, and outreach have had many beneficial returns to Mississippi and Alabama. Sea Grant funding of various research projects has resulted in numerous patents. It has also led to new processes in marine biotechnology for pollution control. Sea Grant has contributed vital information for public understanding of the value of coastal ecosystems. The Consortium has been and continues to be a national leader in marine education programs. Advisory programs in Mississippi and Alabama have reached thousands of commercial and recreational fishermen as well as coastal residents and visitors.

Designing MASGC's New Strategic Plan

Trends in the National Sea Grant Network provide a context of concerns that call for a regional strategic planning activity for MASGC. As outlined within the National Network Plan, these trends include unprecedented population growth along coastal areas, disruptive pressures on marine environments, increased expectations by coastal inhabitants concerning the protection and preservation of marine resources, massive technological innovation, and globalization. Though initiated at the national level, these issues are based upon demographic, economic, and political trends that apply to MASGC as well.

The Mississippi and Alabama coastal regions have a variety of changing demographic, economic, and political climates that, taken together, form a highly volatile environment within which strategic priorities must be identified.

Explosive population growth, the emergence of a vibrant tourist and gaming industry, and competitive social and political interests concerning the development of marine resources are the major issues facing coastal residents.

Over the last two decades, population shifts to the coast and massive habitat losses have resulted in unprecedented degradation of the marine environment. Population growth along the Gulf of Mexico is expected to increase 20 percent in the next 20 years. Within this high growth area is the Mississippi Gulf Coast, which is predicted to be the nation's second busiest gaming center by 2002.

The Biloxi-Gulfport-Pascagoula (Mississippi) and Mobile (Alabama) metropolitan statistical areas (MSA) rank in the top third in terms of percent growth in their metropolitan populations since 1990. This population growth has been reflected in substantial increases in the civilian labor force, with over 50,000 newly employed coastal residents in Mississippi and Alabama from 1994 to 1998 alone (U.S. Census Estimates, 1996).

In addition to the demographic changes evident in the MASGC area, tremendous growth in new business development, dockside casino gaming, and tourism has occurred. From 1991 to 1997, there was an estimated 3,100 new private non-farm business establishments created in the MASGC coastal area (Bureau of Labor Statistics, 1997).

Overall, Gulf of Mexico tourism is estimated to generate \$20 billion per year. Tourism to the Mississippi and Alabama coasts has increased dramatically over the last several years. Dockside gaming in Mississippi has dominated this explosive tourist influx to the area—Mississippi has seen a 70 percent increase in the number of trips per visitor to the state between 1977 and 1995. These trends also occur along Alabama shores, with an approximate increase of 30 percent in the number of trips per visitor (American Travel Survey, Bureau of Transportation Statistics, 1995).

These trends are expected to continue into the foreseeable future. Dockside gaming revenues along the Mississippi coast already represent a multi-billion dollar impact on the coastal region's resources and inhabitants. Overdevelopment has catalyzed new public, political, and scientific concerns in marine issues which has dramatically increased the importance of Sea Grant's work. These pressures and the associated conflicts between business development interests and marine preservation interests are escalating the competition over the coastal marine environment. Advocacy groups and real estate development already exist in conflict. Competition over coastal marine resources provides

perhaps the most challenging trend over the next five years.

"The key to achieving sustainable governance of the oceans is an integrated (across disciplines, stakeholder groups, and generations) approach based on the paradigm of 'adaptive management', whereby policy-making is an iterative experiment acknowledging uncertainty, rather than a static answer"

—Principles for Sustainable Governance of the Oceans

In a manner consistent with the National Network Plan, MASGC has focused its limited resources on these issues and others that are important to the constituents and stakeholders of this region. To accomplish this, a new strategic planning process was implemented to gather information from all MASGC stakeholders. Through in-house research, these stakeholders were identified as the MASGC Board of Directors, National Sea Grant Office representatives, the directors of MASGC legal, outreach and education units, marine research scientists, coastal community stakeholders, and MASGC administrative staff.

For each stakeholder group, participants were invited to half-day or full day sessions to gather information, identify MASGC strategic challenges, and arrive at consensus concerning MASGC priorities for the next five years.

Stakeholders participated actively using GroupSystems®, a personal computer-based group decision support system (Sky, 1998). This innovative, networked computer system allows all participants to simultaneously and anonymously enter questions, opinions, and comments, with subsequent facilitated discussion and consensus building. As part of each session, the resulting comments and opinions were tabulated and shared with the participants. Summaries of the results of each session were printed out at the workshop. By the next day, the results were posted on the MASGC web site for comments. Subsequently, the results were analyzed and used to help create this Strategic Plan. A list of the participants in the group decision support process sessions is included in Appendix III.

In fact, this strategic plan is only a piece of a new organizational framework. MASGC envisions a seamless relationship between its strategic plan, its implementation plan, and its annual reporting process. The MASGC planning process is being initiated with the development of this strategic plan, within which implementation strategies will be formed to move MASGC towards its strategic goals. MASGC annual reports will reflect the progress on implementation strategies and will assist in the identification of the needs and resources required to fully achieve organizational goals.

MASGC plans to accomplish the following during the 2000-2005 strategic planning period:

- **Establish an Office of Alabama Programs**
- **Designate new "Sea Grant Centers of Excellence" at member institutions**
- **Create a not-for-profit MASGC Foundation**
- **Build an award-winning communications program**

Using this model, consistency between goals, actions, and the evaluation of those actions are maintained. Therefore, this strategic plan creates a "living document" within which action and assessment are regularly compared to the original strategic goals and objectives.

Another aspect to this new framework is MASGC's position as a bistate, multi-campus Sea Grant Program. This has created unique political and organizational challenges for its leadership. The independent consortium model requires MASGC to make a strong effort to build each of the three Sea Grant "pillars" of marine research, education, and outreach within each member institution, and to

assist each member institution to recognize its own unique contribution to the consortium as a whole.

The MASGC Board of Directors recognizes that the operation of this unique Sea Grant consortium must take a new and more proactive direction to facilitate input and buy-in from its member institutions.

To assist in implementing this strengthening effort, MASGC proposes a reorganization process whereby the "ownership" of Sea Grant is decentralized and tied more closely to each member institution. This activity represents a focused effort to create an organized presence of Sea Grant research, education, and outreach as an integral part of each institutional member. This new Sea Grant vision creates "Sea Grant Centers of Excellence" at each member institution, allowing the institution to see its Sea Grant efforts in a more holistic manner and with Sea Grant playing a pivotal role in catalyzing new marine research, education, and outreach activities at member institutions.

These activities provide a new organizational framework within which overall strategic goals and objectives of this plan are outlined and annual implementation plans developed.

Fulfilling the Sea Grant Mission

The National Sea Grant College Program sees as its primary responsibility the advancement of the nation's interest in its marine resources. This mission is legislatively mandated and seeks to organize university researchers and educational partners to work towards the advancement of marine issues for those inhabitants along our nation's coastal areas, the Great Lakes states, and Puerto Rico.

The National Sea Grant vision for 1995-2005 sees the strategic areas of Economic Leadership, Coastal Ecosystem Health and Public Safety, and Education and Human Resources as having particular significance for the future.

MASGC is committed to interdisciplinary environmental scholarship and community-based natural resources management. MASGC supports applied, interdisciplinary marine science research, education, and outreach efforts using both targeted and cross-cutting approaches to foster the sustainable development and management of the Alabama and Mississippi coasts and nearshore ecosystems of the Gulf of Mexico.

MASGC's priority program areas for 2000-2005

- Marine Biotechnology and Industrial Ecology
- Sustainable Fisheries
- Coastal Ecosystems and Habitats
- Marine Education and Outreach

Economic Leadership

Sea Grant's leadership is expected to assist in balancing economic expansion and coastal development with coastal environmental health. To accomplish this, the National Sea Grant College Program, through integrated research, technology transfer, and educational programs, contributes to the sustainable development of marine resources and improved economic competitiveness in global technologies.

The National Sea Grant initiative includes three major program elements to assist critical needs:

Advanced Technology for Commercial Products and Processes - application of advanced technologies, including biotechnology, to develop marine products and processes for medical, industrial, and environmental applications;

Seafood Production - research and education collaboration with industry and government to solve technology and policy problems associated with increasing demands for seafood;

Coastal Economic Development - university-based programs that address coastal economic development and marine-related businesses, with a focus on balancing economic growth, protecting unique marine resources, and preserving the cultural assets and infrastructures of coastal communities.

MASGC's Priorities in Marine Biotechnology and Industrial Ecology

Overwhelmingly, quality of life, the management of growth, and coordinated coastal development planning were the most important issues identified by grassroots stakeholders during MASGC's strategic planning process. Research directions identified by MASGC scientists during their strategic planning sessions included the preservation of green space in the Mississippi and Alabama coastal areas, the legal aspects of new biotechnology developments, and the increase in government regulations for health and safety in seafood production.

Clearly, MASGC research and outreach activities must engage these issues and include these constituency groups when forming new research directives in this initiative area. In addition, research into marine aquaculture, including its economic advantages, multiplier effects, and environmental impacts are of particular importance to MASGC scientists and researchers.

The ocean holds the largest proportion of the world's biodiversity. Of the 27 diverse phyla of life, only 17 occur on land, but all 27 occur in the ocean. The sessile nature of many marine organisms has allowed them to evolve a unique repertoire of chemicals for their defense, communication, and reproduction. Many ocean creatures have developed novel metabolites with potent pharmacological properties. There are unique molecular structures not duplicated anywhere else, a potential treasure-trove for new drug discovery.

While marine natural products have provided a number of very important biochemical reagents that are used in cell biology, neurosciences, and almost every facet of modern biology, few have become major drugs or natural products of importance to human welfare. The majority of compounds that show promise as new anti-cancer drugs come from the ocean; in fact, the list of novel anti-cancer drug candidates now at the National Cancer Institute includes more compounds from the ocean than from terrestrial sources.

Industrial ecology is a new approach that analyzes the entire industrial process for product development and incorporates environmental concerns, leading to improved environmental sustainability, business strategies, operational practices, and cost savings. The aim is to establish an integrated framework for industrial environmental management that coordinates energy and material flows and life cycle assessments into product and process development and project planning.

Strategic Goals in Marine Biotechnology

- Marine natural products chemistry and product development, especially innovative university-industry linkages
- Innovative approaches to prevent and control marine invasive species from ballast water

Strategic Goals in Industrial Ecology

- Ecological analyses of industrial material flows and new coastal pollution prevention processes or strategies

- **Models/methods for a quantification of solid, liquid, gaseous, and energy flows in industrial activities in order to manage these flows within ecologically sustainable limits**
- **"Green" oceanic transportation systems, especially "green" ships and ports**
- **"Green" industrial processes in seafood processing and other coastal industries**

MASGC's Priorities in Seafood Production

The Gulf of Mexico has been called the "fertile crescent." In 1996, more than 1.5 billion pounds of fish and shellfish were harvested from the Gulf, worth about \$682.3 million. Most of the Gulf's heavily exploited, economically important fish and invertebrate species are under great pressure and are reliant upon estuarine and nearshore habitats and ecosystems.

Too little of the fisheries environmental science done to date has assisted coastal zone managers. Fisheries management is still an inexact science unable to explain stock declines throughout the world. There is an urgent need for interdisciplinary fisheries science to explain variabilities in economically important stock, and to determine the contributions and roles of: the (1) loss of essential fish habitats; (2) impacts of natural, seasonal, and climatic fluctuations; and (3) increased fishing and the impacts of artificial reefs on economically important fish and invertebrates in the northern Gulf of Mexico.

In the 21st century, aquaculture scientists will need to spend as much time on technological and engineering advances coming to the field as they do on designing ecological approaches to aquaculture development that clearly exhibit stewardship of the environment. For aquaculture development to proceed to the point where it will be recognized as a major contributor to new fisheries production, clear, unambiguous linkages between aquaculture and the environment must be created and fostered. It is important that the complementary roles of aquaculture in contributing to environmental sustainability, rehabilitation, and enhancement must be articulated to a highly concerned, increasingly educated and involved public.

Strategic Goals in Sustainable Fisheries

- **Roles and impacts of restocking and artificial reefs on capture fisheries**
- **Oyster habitats and fisheries, and sustainable methods of oyster aquaculture**
- **Development of marine aquaculture species**
- **Development of sustainable offshore aquaculture systems, and land-based hatchery and nursery support systems**
- **Seafood safety and public health, especially seafood pathogen detection and seafood processing**

Coastal Ecosystem Health and Public Safety

The National Sea Grant College Program believes that long-term policies and programs that are aimed at protecting and enhancing coastal ecosystem health are necessary. These programs and policies include research in water quality, habitat loss, nutrient and toxic inputs, and pollution. The development and implementation of nonpoint source pollution control programs in cooperation with federal, state, and local governments are a particular National Sea Grant focus. The National Sea Grant initiative includes three major program elements:

Coastal Ecosystems - protecting and enhancing the health of coastal ecosystems by improving the quality of coastal and Great Lakes waters. Sea Grant will develop nonpoint source pollution control

programs, develop and transfer new environmental technologies to reduce or eliminate water pollution from the seafood producing and processing sector, and provide information to marine resource managers and regulators on ecosystem structure and function and the effects of declines in water quality on these systems;

Coastal and Great Lakes Habitats - address habitat sustainability and productivity with respect to commercial and recreational fisheries. Additionally, Sea Grant will provide information and guidance to resource managers and regulators on the impact of habitat alteration and loss on ecosystem and fisheries productivity;

Sustainable Development - providing policy makers, regulators, and resource managers with new capabilities to assess the links between the physical, biological, economic, and social sciences and environmental policy. This element requires Sea Grant to provide accurate, unbiased information on the potential economic and social impacts of current and proposed plans, policies, and regulations and to develop new approaches for evaluating the effectiveness of policies in preventing, managing, and ameliorating environmental problems in the coastal zone.

MASGC's Priorities in Coastal Ecosystems and Habitats

In deciding on its focus in these areas, MASGC takes into account that the United States tenures the largest ocean area of any nation on Earth. The U.S. has 95,000 miles of coastline and 3.4 million square miles of territorial seas. In 1996, about \$590 billion worth of goods passed through U.S. ports—41 percent of the value of U.S. foreign trade. About one-third of our Gross National Product (GNP) is produced in coastal areas. One in every six jobs is performed in a marine-related industry. Estuarine and continental shelf areas of the world are responsible for 78 percent of primary production and, potentially, 62 percent of the world's harvestable marine fish, shellfish, and seaweeds (Ryther, 1969). In these precious areas, the bulk of our Earth's natural wealth and most of the world's population are concentrated.

Not surprisingly, research scientists, grassroots stakeholders, and senior research directors participating in the strategic planning process agree that water quality issues are particularly important to MASGC and its strategic mission. The development of interdisciplinary, collaborative programs to handle ecosystem health issues on the Mississippi and Alabama coastlines are of particular importance.

The MASGC geographic area includes many estuarine river systems and a complex barrier island network. The Pascagoula River Estuary and Mobile Bay Watershed represent key water systems to coastal constituencies and have for some time been critical to MASGC's research and outreach mission.

The 480 square mile Mobile Bay estuary contains a documented 337 species of fish, more species per area than any other region of North America. Of the 74 major river estuaries in North America, the Pascagoula is *the only one* in the United States that is unaffected by river channel fragmentation and flow regulation along its entire length (Dynesius and Nilsson, 1994). The Pascagoula is a vital center of biodiversity and essential fish habitats and has a viable Gulf sturgeon population reproducing near Hattiesburg, Mississippi.

Many of the participants within the focused planning groups point out the difficulty MASGC has in fully funding all research programs in coastal ecosystem research. These respondents suggest that MASGC may best implement these particular strategic goals through the leveraging of other funds. Strategic research goals for the Gulf of Mexico being developed by MASGC in partnership with the Environmental Protection Agency's (EPA) Gulf of Mexico Program is one example of the kind of leverage needed.

Strategic Goals in Coastal Ecosystems and Habitats

- **Conserve, recreate and rehabilitate damaged wetlands, oyster reefs, and seagrass ecosystems**
- **Sustain beach and barrier beach island ecosystems; understand and prevent beach erosion; develop alternatives to coastal armaments; restore damaged beaches; develop beach and sand research and management plans**
- **Conserve water quality and understand the impacts of eutrophication and development on living marine resources of Mississippi Sound and Mobile Bay**
- **Investigate non-native species impacts on biodiversity, trophic ecology, community structure and function; develop technological approaches to control Gulf of Mexico aquatic nuisance species from ballast water**
- **Understand nonpoint source pollution, and coordinate economic development with Gulf of Mexico ecosystem sustainability efforts**

Education and Human Resources

The National Sea Grant College Program envisions a higher quality of life and a better understanding of our national marine resources through the development of an informed citizenry and the production of highly qualified marine scientists and professionals. This initiative is central to the support of marine science education and outreach within our national and global societies. Through this initiative, integration and facilitation of marine scientific and environmental information is key, which, in turn, assists and informs business leaders, marine policy regulators, and the lay public.

The National Strategic initiative includes two major program elements to assist critical needs for this strategic focus.

A Highly Trained Work Force - Sea Grant institutions provide support and guidance for marine undergraduate and graduate education to ensure highly trained marine science professionals exist now and in the future;

A Scientifically and Environmentally Informed Citizenry- the development, implementation, and assessment of educational programs by Sea Grant educators to provide marine and coastal information as well as a focus on local issues and ecosystems. This knowledge will be transferred through teacher inservice and preschool programs.

MASGC's Priorities in Marine Education and Outreach

MASGC has a nationally known presence as a leader in K-12 and graduate marine education. The Consortium is one of the largest supporters of marine science graduate education in the bistate area. Existing educational activities sponsored and facilitated by MASGC continue to provide outstanding educational programs for the public. While participants in the strategic planning process acknowledged the strength of MASGC in this initiative area, they have identified some important additional opportunities that can expand upon this portion of the MASGC mission.

MASGC is interested in marine education programs that foster an increased awareness and understanding of marine environments in order to create a more knowledgeable citizenry capable of making responsible decisions concerning these fragile areas. MASGC will support educational efforts for the general public to help people better understand the inter-connectedness of all species, the integration of environmental knowledge into every day life, the awareness of how environmental

science is connected to policies that are shaping the lives of coastal residents, and to facilitate increased math and science capabilities by using innovative environmental models.

Strategic Goals in Education and Outreach

- **Enhancement of marine environmental education at the K-12 levels in Mississippi and Alabama schools**
- **Volunteer efforts, public engagement and activism in coastal and marine issues**
- **Support for underprivileged students to obtain undergraduate summer experiences at marine science institutions in Mississippi and Alabama**
- **Establishing connections with minority-serving institutions to encourage the development of new marine science professionals**
- **Support for visiting post-doctoral scholars in residence at member institutions**
- **Work with aquariums and science centers to form synergies**
- **Facilitate marine education outreach to inland areas of Mississippi and Alabama**

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Last modified: Tuesday, 23 October 2001