MIT SEA GRANT
STRATEGIC AND IMPLEMENTATION PLAN, 2010 – 2015

Introduction

Our strategic plan is inspired by our vision and governed by our goals and objectives. Our efforts in research, education, and outreach are designed to address critical marine and coastal issues at the state, regional, national and global levels. Our plan describes our mission as a Sea Grant College Program, as well as the geographical and institutional context in which we operate. We also provide some detail on the areas in which MIT Sea Grant has significant expertise and potentially significant impact.

Our goals represent a challenge to the investigators in our research network as well as to our colleagues in education and outreach. These goals mold and govern our annual solicitation for new proposals, and guide us in both the long and short term toward projects whose success can best serve our constituents.

Mission Statement

The mission of the MIT Sea Grant College Program is to develop technology to enable scientific investigation into problems surrounding the human use of the sea. Our education and outreach efforts disseminate the results of our research, encourage the adoption of sustainable and useful technologies, and support public policy and businesses with information that is evidence-based and scientifically sound.

Vision

The Sea Grant College Program at MIT is positioned to bring the substantial intellectual abilities of the Massachusetts Institute of Technology and our institutional collaborators to bear on a number of ocean-related challenges. In meeting these challenges with extraordinary technical contributions, we will expand our knowledge of the ocean, and also establish the collaborative infrastructure to support the initiatives and talent needed to address threats to our critical and fragile marine resources.

THE CONTEXT OF OUR PROGRAM

The National Sea Grant Program

Congress established the National Sea Grant College Program in 1966 to hasten the development, use and conservation of the nation's coastal waters and Great Lakes. The legislation called for a network of Sea Grant Colleges to conduct education, training, and research in all fields of marine study, and directed that grants and contracts would go to "suitable public and private institutions of higher education, institutes, laboratories, and public or private agencies which are engaged in, or concerned with, activities in the various fields related to the development of marine resources." [PL 89-688 Sec. 204(c)]

MIT received its first funding from Sea Grant in 1968 and was designated as a Sea Grant College Program in 1976. Today, there

are 30 Sea Grant programs in coastal and Great Lakes states and in Puerto Rico. As part of the National Oceanic and Atmospheric Administration, the National Sea Grant Program supports scientific research in coastal and ocean engineering, fisheries science, and marine-related social sciences and law. To ensure that programs respond to local as well as national concerns, the law requires that one-third of the program funds come from non-federal sources such as industry or state or local governments.

The Local Landscape - The Commonwealth of Massachusetts

The Commonwealth of Massachusetts has a rich and colorful maritime history and a significant part of the Commonwealth's economy remains dependent on the sea. However, unlike during colonial times, the finiteness of the ocean's bounty has been realized.

Massachusetts boasts 1,500 miles of coastline with an estimated 6.4 million people, making it one of the most densely populated states in the USA. Coastal industries such as tourism, shipping, and commercial fishing contribute an estimated $70.7 billion to the Massachusetts economy. Development in these industries, however, can threaten the state's marine ecosystems upon which their existence depends. Negotiating the wise use of the Commonwealth's maritime resources requires the best and most accurate scientific information and it is the mission of MIT Sea Grant to make that information available.

The Region - The Gulf of Maine

The Gulf of Maine is a semi-enclosed sea, an ecosystem bounded to the south and east by tall underwater land forms, or "banks," and to the west and north by the coasts of Massachusetts, New Hampshire, Maine, New Brunswick, and Nova Scotia. It includes the Massachusetts and Cape Cod Bays; its watershed extends inland to affect 41% of Massachusetts' land mass. Our strategy is to place our research and outreach efforts in the context of this regional ecosystem. Particularly significant areas in the region are:

- **Georges Bank:** Its relatively shallow waters, large area and great variety of fin and shellfish make it one of the most productive fishing grounds in the world.
- **Boston Harbor** : In the 1980s, Boston Harbor was considered one of the most polluted in the country. Today it is dramatically cleaner, with wastewater treatment facilities on harbor islands and a nine-mile outfall tunnel for effluent discharge out to Massachusetts Bay.
- **Stellwagen Bank**: An area virtually within sight of Boston, Stellwagen is one of 14 designated National Marine Sanctuaries. Stellwagen is an important source of food and a breeding ground for a number of whale species, supporting local whale-watching tours.
- **Watersheds**: A watershed of 65,000 square miles feeds the Gulf of Maine, including land in eastern New England, the "down east" landmass of northern Maine, and the Maritime Provinces of New Brunswick and Nova Scotia. The Massachusetts/Cape Cod Bay watershed consists of 13 rivers and individual watersheds. Of the 351 cities and towns in Massachusetts, 161 fall within this watershed.

Our Host Institution - The Massachusetts Institute of Technology

MIT was founded in 1861 to establish a new kind of independent educational institution relevant to a newly industrialized America. From its inception the Institute has been guided by the philosophy that professional competence is best fostered by coupling teaching with research and by focusing on real-world problems.

The mission of MIT is to advance knowledge and educate students in science, technology, and other areas of scholarship that will best serve the nation and the world in the 21st century. The Institute is committed to generating, disseminating, and preserving knowledge, and to working with others to bring this knowledge to bear on the world's engineering and technological challenges. MIT Sea Grant's work with artificially intelligent underwater vehicles and new kinds of subsea communications is made possible by the intellectual resources and environment of the Institute. MIT promotes broad collaboration among MIT, industry, and government in order to promote education, research, and service to the larger community.

President Susan Hockfield recently announced the creation of an MIT Energy Initiative to address pollution, economic dependence on foreign oil, and other issues related to the nation's energy needs In the spirit of this initiative and in the interest of preventing climate change, MIT Sea Grant is supporting research in wave and current power generation, algae-based bio-fuels, technology to eliminate oil-spill pollution, and "green" uses of the sea and its resources for energy production.

The MIT Sea Grant College Program

The Massachusetts Institute of Technology was designated as a Sea Grant College in 1976-the first private institution of higher learning to be so appointed. Our innovative marine research is guided by the unique resources of higher educational institutions in Massachusetts and by local and national research needs. We draw on and support the expertise and ingenuity of researchers from MIT, the University of Massachusetts, Boston University, Harvard University, Northeastern University, and other colleges and universities in the region In addition, we benefit from our partnership with the Woods Hole Oceanographic Institution Sea Grant Program. Our collaborative approach ensures that we involve a broad spectrum of industrial and governmental groups and government agencies.

Integral to our commitment to basic and applied research are outreach and education. Through outreach we ensure that useful research results reach our constituents, and that we are aware of their needs. Our educational scope ranges from educating school children about marine bio-fuels to nurturing and challenging undergraduate and graduate students who will become the marine researchers and coastal managers of tomorrow.

MIT SEA GRANT STRATEGIC GOALS

Focus Area: HEALTHY COASTAL ECOSYSTEMS

Goal: Scientific information to support ecosystem-based approaches to managing the coastal environment through strategies such as...

- ... conducting research on ecosystem processes, including the relationship between coastal stressors and human and ecosystem health. This includes research on water quality, contaminants, harmful algal blooms, and invasive species.
- ... contributing to the development of baseline data, standards, and indicators. We will develop platforms, sensors, underwater communications capabilities and manipulators for collecting synoptic data in a cost-effective manner.
- ... developing methodologies to assess the effectiveness of ecosystem-based management approaches once they are in place, working with the National Marine fisheries Service and other federal, state and local partners to guide future management efforts.
- ... communicating research results and information to public and private planners, decision-makers and managers.

Goal: Widespread use of ecosystem-based approaches to managing land, water and living resources in coastal areas, promoted by...

- ... working with partners within and outside of NOAA to collect data, and develop models and training programs to share with a broad cross-section of stakeholders.
- ... supporting the development of regional coastal observation systems and infrastructure to advance our capacity to predict the effects of human activities, the spread of invasive species and environmental changes on coastal resources in order to mitigate their effects.
- ... providing learning programs and materials for people of all ages to enhance understanding of coastal and ocean environments and promote stewardship of healthy ecosystems.
- ... contributing to the development of an integrated ocean circulation model for the Gulf of Maine for use by the scientific community in coastal zone monitoring, fisheries management, pollution control and similar applications.
- ... developing methodologies to determine the optimum spatio-temporal distribution of observation points for initialization and data collection to support ocean forecasting.
- ... providing technical support for citizens and business, federal and state partners who need access to state-of-the-art ocean circulation models.

Focus Area: SUSTAINABLE COASTAL DEVELOPMENT

Goal: Healthy coastal economies, including working waterfront, businesses recreation and tourism opportunities through ...

- ... providing technical support for citizens and businesses, federal and state partners who need access to state-of-the-art ocean circulation models and alternative energy in order to responsibly plan for coastal development and its effects..
- ... training managers in proper use of these models so that coastal marine resources are protected and utilized
- ... engaging coastal communities in identifying and pursuing sustainable, environment-friendly development projects, supporting working waterfronts, mitigating global warming, and enhancing waterfront-related economic activities

Goal: Coastal communities that make efficient use of resources and protect the resources needed to sustain coastal ecosystems and quality of life through ...

- ... leading a volunteer water quality monitoring program for students and teachers that has local, national and eventually international impacts..

Focus Area: SAFE AND SUSTAINABLE SEAFOOD SUPPLY

Goal: to guarantee a sustainable supply of safe seafood that meets public demand at an affordable price we will ...

- ... develop and disseminate essential knowledge about natural and human threats to the long-term viability of wild fish populations.
- ... identify ways to minimize these threats.
- ... use ecosystem-based fisheries management and other innovative approaches to accomplish this.
- ... mitigate impacts of invasive species in ways that are consistent with national objectives, building on the leadership role Sea Grant plays in this area.
- ... enhance management and productivity of wild fisheries in the Northeast region.
- ... offer training, technical assistance, and outreach programs on standards for minimizing release of live seafood and the unregulated introduction of non-native species.

Focus Area: HAZARD RESILIENCE IN COASTAL COMMUNITIES

Goal: Fuller understanding of the risks associated with living, working, and doing business along the nation's coasts through ...

- ... research in deep-water corals to understand patterns of past climate changes and use this information to forecast the effects of global warming.
- ... a national symposium to share the findings of the research, particularly as it affects global warming and climate change
- ... working with the NOAA Climate Change Program and other public and private sector partners to develop comprehensive education/literacy programs focused on the immediate and long-term effects of climate-related changes

IMPLEMENTATION

To implement its strategy and achieve its objectives, MIT Sea Grant will maintain an active portfolio of research, education and outreach projects and activities. These projects and activities will be selected and judged by how they further our strategic plan, and on their scientific quality, the significance of their contribution, and their competitiveness.

Research projects are solicited yearly from Principal Investigators through a Request for Proposals process. Outreach plans for Marine Advisory Services (MAS), Communications and Education are assembled and reviewed by MIT Sea Grant staff and management team every four years. We also administer other awards and grants through Institute, state and special national funding competitions. Accomplishments under these special awards are folded into our implementation plan in the chart below which depicts the specific, measurable outcomes and objectives we will achieve in the various focus areas.