North Carolina State University

Center for Marine Sciences and Technology

Mission

The mission of the Center for Marine Sciences and Technology (CMAST) at North Carolina State University is to serve our citizens and others who value coastal natural resources by:

- fostering research designed to improve our understanding of coastal natural resources and environments, including modifications caused by various uses;
- improving the coordination of multi-disciplinary programs necessary to understand the complex coastal ecological land, water and atmospheric coupled system;
- providing education and training opportunities for students in marine sciences;
- promoting the development of improved technology related to use of coastal resources and for coastal industries; and
- extending marine sciences academic and outreach programs to citizens of North Carolina.

All of the above are consistent with N.C. State University's mission as a land grant, Research I University.

To sustain and better manage the coastal environment requires improved knowledge of coastal natural and economic processes as well as the many conflicts that arise in the use of natural resources. CMAST will focus efforts of NC State University's marine sciences faculty toward improving our collective stewardship and management of these valuable natural resources. Much of the activities of CMAST will take place at the coastal facility located in Morehead City on the Carteret Community College (CCC) campus, which is in close proximity to the UNC-Chapel Hill Institute of Marine Sciences (IMS) and the N.C. Division of Marine Fisheries (DMF). CMAST will provide links to CCC, offering opportunities for cooperative technology programs and distance learning. Facilities shared with IMS and DMF will make more efficient use of state resources, and represent an important step for North Carolina's two leading research universities better serve students and citizens of our state. In these and related activities, CMAST will further extend N.C. State University's capabilities in fulfilling its broader mission.

Goals and Objectives

The primary goal of CMAST is to bring together scientists and specialists in education and

extension from the participating colleges in N.C. State University, into a more cooperative and cohesive organization. In addition, CMAST will provide a focal point for citizen contact with N.C. State University's marine science faculty, and for improved faculty interaction with other universities and agencies concerned with the coastal environment. CMAST objectives include:

- increasing the knowledge base for understanding and managing our coastal natural resources;
- providing knowledge transfer to students, coastal industries and other resource users; and
- establishing and operating a field laboratory in Morehead City on the CCC campus.

Uniqueness of the Center

N.C. State University's CMAST will focus on aspects of marine sciences that differ from and complement the collective emphases on marine sciences at the University of North Carolina at Chapel Hill (UNC-CH), East Carolina University (ECU) and the University of North Carolina at Wilmington (UNC-W). This involves establishing at the CMAST coastal facility in Morehead City distinct capabilities focused on:

- atmospheric/land/ocean couplings along the coast using advanced technologies and models to improve predictions and/or measurements in marine meteorology; severe storm formation, tracking and forecasting; real time coastal and estuarine flooding; global climate change effects; coastal air pollution; satellite oceanography; computer visualization; coastal geophysical dynamics; marine biotelemetry; estuarine plume, inlet and barrier island dynamics; biochemical cycling and paleooceanography;
- mariculture and aquaculture, and enhancement of shellfish and finfish stocks;
- seafood science, processing and packaging;
- marine clinical medicine, pathology, and epidemiology and toxicology;
- agriculture effects on the coastal environment;
- coastal and marine engineering and mineralogy;
- wetland forestry, parks and recreation;
- marine textiles;
- marine, fisheries and other coastal resource economics; and
- formal extension programs.

All of the above complement activities at the other UNC campuses. The following descriptions of research at UNC-CH, UNC-W and ECU are taken directly from the February 18, 1994, UNC Report on Marine Sciences at The University of North Carolina and can be found on pages 17-21 of the report.

The research programs at UNC-CH has a Marine Sciences program dating back to the

1940's and enjoys a distinguished faculty with national and international reputations. Research efforts on ocean and coastal aspects of biology, chemistry, geology, environmental science, and physical oceanography include special emphasis on: experimental analyses of ecological processes controlling organization of sea floor communities; biogeochemical cycling of N, P, C, Ca, O, S; ecology of marine algae, bacteria, fungi and fish; biogeochemical processes driven by decomposition of naturally occurring organic matter; sedimentary geochemistry and sediment/water exchanges; geological processes of carbonate environments- morphology, erosion, cementation, calcification, sedimentation; geology of sedimentary coastlines-formation, evolution, geomorphology, environment implications; ecology, paleontology and mineralogy of marine mollusks; physical dynamics of the Gulf Stream-meanders and other mesoscale features; and air-sea physical interactions in coastal and near shore water; turbulence currents and sedimentation in shallow coastal lagoons and estuaries.

UNC-W's research programs have been primarily focused on coastal and near shore marine environments. Recent new hires are broadening the scope of these activities to include the deep ocean. Their research provides information related to many types of marine resources in North Carolina. Faculty researchers direct research at national and international levels. Overall, UNC-W presents a balance of basic and applied marine sciences research in a variety of areas such as the following: biofouling by gregarious macro fauna, a multi disciplinary approach; factors affecting reproduction and migration of water birds in North Carolina; a study of the New Hanover County tidal creek area; fundamental design parameters for artificial reefs; patch reef spacing and design; physiology and health of Florida's coral reefs (NURC-sponsored research); biomineralization, environmental physiology and neurobiology of marine organisms; marine biotechnology, marine natural products chemistry and aquaculture; and mixed-gas diving technology and diving physiology.

Twenty-five to thirty members of ECU's current faculty have coastal resources research and teaching interests. Approximately fourteen of these have credentials that are sufficiently strong to qualify them to participate in the supervision of doctoral students in the area of coastal resources management. Moreover, these fourteen are concentrated in the three areas of program strength. Five are in the area of estuarine and coastal ecology, five in the area of coastal plain and continental margin geology, and four in maritime social science and policy. Over the past decade, faculty with coastal resources research interests have secured over 75 percent of all non-medical research funding obtained by ECU's faculty.

Synergistic Aspects of the Center

The natural resources of North Carolina's own extensive and diversified coastal system serve as the base for tourism, residential development, commercial fishing, seafood processing,

recreational fishing, and a variety of other economic enterprises in the coastal counties. Coastal North Carolina, in recent years, has been changing dramatically. Increases in population and demand for resources have led to conflicts over resource use, and the need to protect the environment has become more urgent. Contaminants and toxins from both terrestrial and oceanic sources have adversely affected wetlands, water quality, and habitats of fish and shellfish.

The challenge of preserving healthy coastal environments and restoring deteriorated ones requires attention to the impacts of, and the interrelationships between resource uses, and fostering of usage patterns that helps sustain long term economic and environmental health in the coastal zone. NCSU, with the wide range of expertise in its land-grant programs, is ideally suited to address these problems. The complexity of coastal ecological problems requires on-site, interdisciplinary approaches. With the construction of dedicated space to conduct the necessary research, education and extension programs in the coastal area, the creation of CMAST would allow NCSU to better coordinate its varied programs and foster complementary collaborations with other marine science programs in the region. The center would also provide extremely valuable resources and opportunities for advanced undergraduate and graduate training that will enhance the academic programs of all the NCSU colleges involved as well as those of other universities in the region and the CCC.

Educational Impact Statement

Establishment of CMAST will open new opportunities for marine science education in North Carolina. Its coastal facility and the collaborations it will foster with other institutions in Carteret County, such as IMS, the Duke Marine Laboratory and CCC, will provide a base for field-oriented training at several levels. Both undergraduate and graduate students will benefit from the access it provides to a "natural laboratory" for interdisciplinary courses. This will be a major advance for NCSU, which heretofore has lacked any coastal facility and thus existing courses with field components have usually been dependent on the availability of other institutions' facilities.

CMAST will also provide a solid base for education through student research in the coastal zone. This will include short-term, intensive study of sporadic events like storms and their aftermath. A coastal base will be even more important for long-term studies of processes that are dominated by unpredictable events and require students to be on-site for extended periods. These expanded opportunities will greatly augment NCSU's ability to recruit the best new students and provide educational opportunity for them, thereby raising the quality of the university experience for all.

CMAST's coordination efforts, and the proximity of its facility to those of other coastal institutions in the region, will foster interinstitutional collaboration in education. At the graduate level there is the potential for creating interinstitutional degree programs, thus enriching the opportunities for students in a cost- effective manner. Students sited at the coast could be

mentored by a larger, more diverse faculty than could be sustained there by any single institution, thus transcending the "critical mass" problem of most field stations. At the undergraduate level, in-king trading of instructional effort and student contact hours, supplemented by remote teaching over CMAST's TeleVideo facilities, could allow NCSU and collaborative institutions to increase the diversity of courses available to their students. For NCSU students in marine sciences, this could make it possible to spend a semester at the seacoast while maintaining a full course lad and normal progress toward their degrees.

CMAST will allow educational training programs to be offered to students in collaboration with CCC. This will provide unique opportunity for community college students to drive benefit from university resources. Recruiting students to science is best begun early, in grades K-12, often emphasizing hands-on exposure. CMAST's resources, in partnership with "The Science House" at NCSU, will facilitate growth in outreach to future generations of students through various programs like summer "marine science camps."

Funding and Resource Needs

Three components of resource needs for the Center are identified; personnel, facilities and programs.

Personnel Requirements

In addition to personnel already at NCSU who will conduct sponsored programs, resources will be needed for the Center Director and for core personnel to be permanently located at the CMAST facility. Personnel currently located in Carteret County in the Sea Grant program and in the Seafood Laboratory in Morehead City will locate in the facility. In addition, expansion budget requests have been made by several NCSU colleges for permanent faculty (resident faculty) and staff. It is also anticipated that the State of North Carolina will provide at least partial support for the salary of the Center Director. Personnel requirements in programs managed by faculty not permanently assigned to CMAST will generally be provided by the sponsoring agencies and/ or the faculty member's academic home departments/colleges.

Building Requirements

Laboratory Construction: The CMAST facility will serve as the core facility for the Center. Planning and construction funds were appropriated by the General Assembly in the 1995-97 biennium ($7.8M), to be shared equally by NCSU and UNC-CH. Approximately one-half of the total is for the CMAST facility that will be located on the Carteret Community College campus. Construction is expected to be completed in mid-1998. Additional resources will likely be required to upfit laboratories for new projects as well as upfitting specialized laboratories for some of the resident faculty. The required resources will be provided by a combination of direct state appropriations, budgets provided by the University to the Center Director, sponsored projects, and indirect costs associated with sponsored programs operated in the facilities.

Building Maintenance: The usual budgetary arrangements for the maintenance of off-site NCSU buildings will apply to the CMAST facility. The Director, in consultation with the Office of NCSU Vice Chancellor of Business and Finance, will determine the most appropriate method of providing the necessary building maintenance.

Programs

The Center will conduct programs in education, research and outreach, and will coordinate all programs requiring use of the CMAST facilities. Support for programs will come from appropriated and sponsored sources. The Center Director will be expected not only to work with the academic units at NC State to promote and enhance funding opportunities, but with the marine sciences community at large.

All faculty involved in CMAST will be expected to generate programmatic support to augment their programs. The assignment of space and the duration of the assignment will depend, in large part, on the viability of each funded program. Resident faculty and staff such as those in the seafood processing laboratory, and those assigned to the Sea Grant program, will have primary support from the academic unit through which they report.

Financing plans for education and extension programs will be the responsibility of the units involved in the delivery of those programs. Such programs may include units, such as the Carteret Community College, that do not report through NC State University.

Administrative and Advisory Structure

The Center will have a Director and participating faculty, students and staff. The scope of the Center will include, but will not be restricted to, all marine sciences activities conducted in the CMAST facilities in Morehead City. The Center Director will formally report to an Administrative Committee which will receive input from the NCSU Marine Sciences Council and an Advisory Committee.

Director Criteria

The Center Director will be a distinguished marine scientist who will hold academic rank in an appropriate department at North Carolina State University.

Director Responsibilities

The Center Director will be:

- responsible for day to day oversight and management of the CMAST facilities in Morehead City including recommendations of space assignments to the Administrative Committee, coordination of the integrated activities; providing the needed services of the

faculty, students and staff assigned to CMAST facilities; and securing and managing a budget to operate the facility.

- expected to foster the development of academic, research and outreach programs in marine sciences that cross department, college and institutional boundaries, and that are complementary to the activities undertaken in the CMAST facilities.

- expected to help build partnerships with NCSU and between NCSU and other organizations involved in marine sciences.
- expected to report a regular basis to the NCSU Marine Sciences Council, the Administrative Committee and the Advisory Committee.

Administrative Committee

The Center Director will report formally to an Administrative Committee consisting of the Deans of the colleges with participating marine sciences faculty, the Chair of the Marine Sciences Council, and the Vice Chancellor of Research, Outreach, Extension and Economic Development. The Deans of the College of Agriculture and Life Sciences and the College of Physical and Mathematical Sciences will serve as co-chairs of the Committee, with each having the responsibility on alternating years (beginning each fiscal year) of convening the Committee and reporting action items and recommendations of the Committee. At least once per year the Administrative Committee will meet jointly with the Director and the Marine Sciences Council.

Marine Sciences Council

The Center Director will meet regularly with the NCSU Marine Sciences Council. The Council, which has representatives from the marine sciences faculty and from colleges at NC State with faculty who are actively engaged in marine sciences and which reports to the Provost, will provide strategic advice to the Director. The Marine Sciences Council will work cooperatively with the Director in preparing budget requests to the Administrative Committee and in promoting activities of the Center. The Council will also be involved in the selection and review of the Director as well as in the selection of other persons permanently assigned to the Center.

Advisory Council

An advisory Committee will be established with representation drawn from organizations that are outside NCSU. A large fraction of the representation is expected to be drawn from organizations located near the CMAST coastal facility. The Advisory Committee will include at least one ex-officio representative from the Marine Sciences Council and one from the NCSU Administration. The Advisory Committee is expected to meet at least twice per year with the Director and provide advice and assistance to the Director. The Advisory Committee will select a Chair who will be invited to make recommendations on behalf of the Committee either through the Director or to the Marine Sciences Council and the Administrative Committee.

The Director, in consultation with the Marine Sciences Council and the Administrative Committee, will recommend persons to serve on the Advisory Committee.

Participating Faculty

All members of the Marine Sciences faculty will be encouraged to affiliate with CMAST. While marine sciences programs affiliated with the Center will be pursued at various locations, all programs conducted at the CMAST facility in Morehead City will be coordinated by the Center Director. Three classifications of faculty activity may occur at the CMAST facility. They are:

- Resident faculty who are assigned to the CMAST facility and who take up residency in the Morehead City area,

- Rotator faculty whose primary assignments are on the main NCSU campus but who will have funded programs conducted in the CMAST facility for periods lasting for several months up to few years, and

- Project faculty whose primary assignments also are on the main NCSU campus but who may use the project for specific research, teaching or extension programs or activities lasting a few weeks or months.

NC State University
CMAST Charter
February 10, 1997