**SUMMARY MISSION STATEMENT**
**University of Maryland Center for Environmental Science**

Through its four laboratories across Maryland, the University of Maryland Center for Environmental Science (UMCES) is a research, education, and service institution of the University System of Maryland (USM) and a world leader in the science of coastal environments and their watersheds. The Center's faculty advances knowledge through scientific discovery, integration, application, and teaching, that results in a comprehensive understanding of our environment and natural resources, helping to guide the State and world toward a more sustainable future. Through its role as the responsible institution for administration of the Maryland Sea Grant College and numerous collaborative programs with other institutions, UMCES leads, coordinates, and catalyzes environmental research and education within the University System.

UMCES faculty members advise, teach, and serve as mentors to many graduate students enrolled in USM institutions, particularly through the System-wide graduate programs in Marine-Estuarine-Environmental Sciences (MEES), in which UMCES has a leading role. UMCES also delivers its services through environmental science education programs for K-12 students and teachers, pertinent and timely information to the general public and decision makers, technology transfer to industries and the Maryland Sea Grant College.

UMCES contributes to meeting the legislative mandates of the University System of Maryland in numerous ways including: achieving national eminence as one of the world's premier research centers focused on ecosystem science; uniquely integrating research, public service, and education related to the sustainability of environment and natural resources of Maryland and the Chesapeake Bay region; recruiting and retaining a nationally and internationally prominent faculty; attaining research funding and private support far in excess of its state support; promoting economic development; conduct outreach to state and federal agencies; and collaborate with other higher education institutions in Maryland in advanced research and graduate education.

**MISSION STATEMENT**
**University of Maryland Center for Environmental Science**

## INSTITUTIONAL IDENTITY

The University of Maryland Center for Environmental Science (UMCES) is a research, education, and service institution of the University System of Maryland (USM) and a world leader in the science of coastal environments and their watersheds. The Center's faculty advances knowledge through scientific discovery, integration, application, and teaching, that results in a comprehensive understanding of our environment and natural resources, helping to guide the State and world toward a more sustainable future. Through its role as the responsible institution for administration of the Maryland Sea Grant College and numerous collaborative programs with other institutions, UMCES leads, coordinates, and catalyzes environmental research and education within the University System.

The Center originated with the founding of the Chesapeake Biological Laboratory in 1925 and presently conducts programs through four geographically distinct laboratories (Appalachian Laboratory in Frostburg; Chesapeake Biological Laboratory on Solomons Island; Horn Point Laboratory near Cambridge; and the Institute of Marine and Environmental Technology in Baltimore).

In addition to the USM legislative mandates in Education Article Section 10-209, the Center operates under a specific statutory mandate (Natural Resources Article Section 3-403) to "conduct a comprehensive program to develop and apply predictive ecology for Maryland to the improvement and preservation of the physical environment." In executing this mission, UMCES plays a key role in advancing knowledge in support of Maryland's international reputation for progressive environmental management and sustainable economic development.

The core purpose of the Center is scientific discovery leading to comprehensive scientific knowledge of our environment and the human consequences of environmental change. Scientific discovery supports the application of knowledge to emerging environmental issues and the education of the next generation of scientists and resource managers. Through these functions, the Center has become nationally and internationally respected for the excellence and multidisciplinary nature of its research, its success in applying scientific knowledge to the management of ecosystems, including the Chesapeake Bay and its watershed, and its multifaceted collaborations in education.

UMCES faculty members advise, teach, and serve as mentors to many graduate students enrolled in USM institutions. Most are enrolled in the System-wide graduate programs in Marine-Estuarine-Environmental Sciences (MEES), in which UMCES faculty have a leading role, Toxicology, as well as graduate programs in Wildlife/Fisheries Biology or Applied Ecology and Conservation Biology at Frostburg State University. Through these multicampus programs the Center is a pioneer in the use of the Interactive Video Network and the internet in graduate instruction. Students focus their M.S. or Ph.D. thesis research in such fields as fisheries science; environmental chemistry and toxicology; ocean science; marine, aquatic and terrestrial ecology;

environmental molecular biology and biotechnology; and environmental and natural resource management.

The Center delivers high-quality services to: K-12 students and teachers through environmental science education programs; the general public and decision makers through timely and pertinent information; and relevant industries (environmental technologies, aquaculture, seafood processing, etc.) through technology transfer directly and via the Maryland Sea Grant College. UMCES also executes its statutory responsibility to provide sound scientific information and advice to Maryland state agencies and the General Assembly.

## INSTITUTIONAL CAPABILITIES

**Facilities and Programs**. The University of Maryland Center for Environmental Science operates world-class research facilities at its four locations across the State. These include: specially-designed laboratories with advanced instrumentation for chemical and biological experiments and analyses, including DNA sequencing and advanced molecular biology capabilities; seawater systems for maintenance of and experimentation with marine and aquatic organisms; extensive shellfish and finfish aquaculture facilities; greenhouses; computational and geographic information systems; the state-of-the-art research vessel *Rachel Carson*; and automated environmental observing systems. The Center's faculty has integrated its disciplinary expertise into six nationally prominent, foundational research strengths: interdisciplinary research in estuarine and coastal dynamics; environmental biotechnology; fisheries ecosystem science; environmental chemistry and toxicology; the ecology of terrestrial landscapes and watersheds; and cycling, transport, and effects of nutrients.

**Collaboration**. A hallmark of the Center's science is a collaborative, multidisciplinary approach to discovery, integration, application, and education in response to the challenging environmental issues of the 21$^{st}$ century. The Center's faculty members actively collaborate with each other and with faculty members at other USM institutions and scientists throughout the world. UMCES relies on its strong relationship with other USM institutions to provide high-quality graduate education to more than 85 students enrolled at those institutions but based at the Center's laboratories. These relationships also provide broad opportunities to increase the diversity of participation in environmental science. UMCES is part of a tripartite collaboration with the University of Maryland Baltimore County and the University of Maryland Baltimore to operate the Institute of Marine and Environmental Technology (IMET). The IMET partnership encompasses a range of research specializations and orientations in support of Maryland's economic development in biological and other technologies, including: the use of aquaculture and genomics to foster conservation and creation of marine resources and bio-energy; environmental observation and sensor development; environmental toxicology and remediation; marine biomedicine development; and sustainable urban ports and ecosystems.

**National Leadership**. The Center's faculty provide national and international leadership by: directing cutting edge research and developing state-of-the-art environmental observations and models; publishing their research results in top scientific journals; conducting national and international assessments of key environmental issues; serving on professional society and

editorial boards; and participating in numerous review panels for science programs throughout the world.

**Maryland Sea Grant**. As the responsible USM institution for the Maryland Sea Grant College, a partnership among the National Oceanic and Atmospheric Administration, University System of Maryland, and State of Maryland, UMCES has an important responsibility to the regional scientific community, as well as state and federal governments. UMCES and Sea Grant share a mission of promoting the conservation and sustainable use of coastal and marine resources contributing to the restoration of Chesapeake Bay and its watershed. UMCES and Sea Grant work together to catalyze scientific research and outreach in a manner that fully engages other research and educational institutions in the State, state agencies, and numerous stakeholders to achieve shared goals.

**Contributions to USM Mandates**. The Center contributes to meeting the legislative mandates of the University System of Maryland in numerous ways, specifically including:

1. achieving national eminence as one of the world's premier research centers focused on ecosystem science;
2. uniquely integrating research, public service, and education related to the sustainability of environment and natural resources of Maryland and the Chesapeake Bay region;
3. recruiting and retaining a nationally and internationally prominent faculty;
4. attaining research funding and private support far in excess of its state support;
5. promoting economic development related to biotechnology, environmental technologies, maritime commerce, natural products, energy, and natural resource utilization, with effective technology transfer, commercialization and business development;
6. maintaining active outreach to state and federal agencies, businesses, elementary and secondary schools, and the general public; and
7. actively collaborating with other higher education institutions in Maryland in advanced research and graduate education.

## INSTITUTIONAL OBJECTIVES AND OUTCOMES

In accordance with its legislative mandate, the Maryland State Plan for Postsecondary Education, and the USM Strategic Plan, the following institutional objectives and outcomes have been specified:

1. Continue to strengthen the Center's capacity for scientific discovery by: a) encouraging science that supports ecosystem-based management; b) implementing multi-scale environmental restoration projects; c) linking observing systems and forecasts from the mountains to the sea; d) assessing the regional consequences of climate change and variability on natural resources; and, e) advancing innovative technologies for use and protection of marine and environmental resources.

Collectively, efforts to achieve these objectives support the Center's legislative mandate to develop and apply a predictive ecology in the early 21st century. Progress will be reflected in part by:

a. steady growth in sponsored research support;

b. peer reviewed publications that are widely cited and highly influential;

c. success in developing and supporting innovative, multidisciplinary, and translational research programs; and

d. peer recognition as a member of the top-most tier of institutions involved in coastal and watershed science.

2. Continue the development of the Center's capacity for integration and application through the Integration and Application Network (IAN) that facilitates transdisciplinary integration of environmental sciences and provides a mechanism to provide scientifically sound advice to the environmental and resource management communities of the Chesapeake Bay region and beyond. Progress will be reflected in part by:

    a. broad and effective involvement of the Center's faculty in integration and application activities;

    b. attraction of substantial external support for these activities;

    c. recognition of the Center as the most effective academic institution in applying environmental science to chart effective courses for the restoration and management of the Chesapeake Bay and its watershed; and

    d. national and international leadership in scientific assessments of critical issues facing the sustainability of coastal environments and their watersheds.

3. Build on the Center's success in graduate education, including the leadership of the MEES program, by updating and reforming existing programs to meet the changing societal and scientific needs, competing more successfully for the most qualified students, and providing expanded opportunities for continuing professional education, including video and web-based delivery of instruction. Progress will be reflected in part by:

    a. effectiveness in leading the reform of the Marine-Estuarine-Environmental Sciences program and improving its national ranking;

    b. stronger qualifications of entering graduate students and greater professional success (awards, placement, etc.) of degree recipients; and

    c. establishment of a successful program for continuing education for environmental science professionals.

4. Expand the role of the Center and the Maryland Sea Grant College in environmental education and awareness of Maryland's school children and citizens by providing State-wide leadership; offering hands-on experiences at the laboratories; contributing to teacher education; and providing scientifically sound information to the public. Progress will be reflected in part by:

a. the numbers of students reached and teachers trained through practical experience; and

b. increased public understanding of issues confronting Maryland's environment.

5. Support the leadership of the Center's faculty within the scientific community and advance environmental science and translational research within the University System of Maryland, the State, the Chesapeake Bay region, and the nation. Progress will be reflected in part by:

    a. achieving and maintaining nationally competitive salaries for attracting and retaining the most accomplished faculty;

    b. participation of faculty members in national and international scientific activities, including scientific advisory panels and professional societies;

    c. leadership of collaborative programs in environmental science and sustainability within the USM; and

    d. effective partnership with UMB and UMBC in IMET to achieve the vision of IMET as an internationally preeminent center for outstanding research in the marine and environmental technologies.