Cooperative Institute for Coastal and Estuarine Environmental Technology

CICEET

Program Brief

CICEET

Serving the technology needs of coastal managers

About CICEET

Established in 1997, the Cooperative Institute for Coastal and Estuarine Environmental Technology (CICEET) is a partnership of the National Oceanic and Atmospheric Administration (NOAA) and the University of New Hampshire (UNH). Through strategic partnerships and direct investments, CICEET develops tools for clean water and healthy coasts nationwide. CICEET's toolkit contains dozens of field ready technologies—with many more in the pipeline—that address coastal resource problems in three ways:

- Detection: tools to detect pollution
  CICEET has sponsored the development of a wide range of sensors, microbial rapid detection methods, Harmful Algal Bloom (HAB) detection and identification, and technologies to collect, relay, and synthesize data.

- Recovery: tools to treat pollution and restore habitats These include technologies to restore and protect shorelines, such as a multi-beam bathymetric model to map the ocean floor in high energy coastal environments, *in situ* sediment remediation technologies, and predictive models and methods for seagrass and saltmarsh restoration.

- Prevention: tools to prevent the impacts of pollution
  These include a unique stormwater treatment evaluation center, methods to reduce nutrient pollution, and models to predict and prevent the impacts of land use change.

CICEET & NERRS

Collaboration with the National Estuarine Research Reserve Sysem (NERRS) is at the heart of CICEET's mission. The reserves' geographic and ecological diversity provides a living laboratory in which CICEET investigators develop and test effective tools for coastal managers. The local and regional networks the reserves foster are important conduits through which CICEET technologies can reach the people who need them most. At the same time, CICEET supports the goals of the reserves and addresses the needs of the communities they serve.

Here's how:

- Key Infrastructure: CICEET invests in the equipment needs of the NERRS, including datalogger upgrades to YSI's extended deployment system, the purchase and evaluation of *in situ* YSI flourometers, and computers to support the GIS capability at every reserve.

- SWMP Support: CICEET is an engaged partner in the NERRS System-Wide Monitoring Program (SWMP), part of the national backbone of IOOS, the Integrated Ocean Observing System. Since 1998, CICEET has invested $2,007,736 in SWMP-related infrastructure and technology demonstration and evaluation projects. CICEET also supports the training of reserve personnel in monitoring-related technologies, and contributes to the NERRS' ability to provide timely and accurate water quality data.

- Needs Assessment: CICEET works with the NERRS to define the priority technology needs of their local coastal resource managers. These assessments help CICEET design competitive funding programs that focus the expertise of leading researchers on the development, demonstration, and application of innovative tools for coastal management.

- Focus on NERRS: CICEET brings the talents of leading researchers to bear on the development of technology to address issues related to the NERRS mission. Every project funded by CICEET's Environmental Technology Development Program (ETD) must have a connection—through research, technology development, demonstration, or outreach—to a NERRS site or its watershed. NERRS personnel often serve as advisors or primary investigators for CICEET projects.

- Serving NERRS Customers: CICEET's partnership with the NERRS Coastal Training Program (CTP) helps bridge the distance between available tools and the coastal managers who need them, through outreach, training, and communications materials. For example, the CICEET-sponsored UNH Stormwater Center is a resource for CTP coordinators engaged in helping land use decision makers develop stormwater management programs to protect water quality.

Learn more

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CICEET & Maryland

Maryland's Chesapeake Bay National Estuarine Research Reserve embraces 4,820 acres of protected area. In the context of habitats like the salt marsh at Monie Bay and the freshwater marsh at Otter Point Creek, the reserve coordinates research, monitoring, education, and volunteer programs to better understand and manage the Bay's estuarine habitats.

The reserve is also a living laboratory for CICEET-sponsored scientists testing solutions to the challenges brought on by increasing population and development—from how to manage polluted stormwater runoff to techniques to track public health threats at swimming beaches.

Investing in Maryland

CICEET has invested more than $4.5 million in coastal environmental technology projects in Maryland's Chesapeake Bay since 1998. Many of these projects focus on nonpoint source pollution, the single greatest threat to water quality nationwide, and a particular problem for Maryland's valuable commercial and recreational fishing industries.

• Urban Site Sustainability Tool: Striking a balance between development and green space is critical to the ecological health of a community but difficult to achieve. To help communties meet this challenge, a team of Washington, D.C.–based researchers is adapting the Green Area Ratio (GAR)—a European decision support system that determines the appropriate percentage of green infrastructure for development—for use in the U.S.

• Land Use Planning Models: To protect natural resources, managers need information on how human interaction with the landscape effects water quality. It is especially important to identify natural resources that need protection and be able to predict the outcomes of different development scenarios. Watershed models are among the best tools to do this, but they often focus on land units that are large compared to the scale of management decisions. This project is using multiple-model averaging to reduce uncertainty when using watershed models.

• UV Protection: Sewage-borne microbes pose a threat to human health and often lead to swimming beach and shellfish bed closures. This project is evaluating a technology that uses ultraviolet (UV) light to kill microbial pathogens.

• Organic Cleaners: Bioretention—the use of soils and plants to filter pollutants from runoff—is a promising approach to treating the pervasive problem of nonpoint source pollution. This project is exploring which soils and mulches are best for filtering different pollutants.

• Missing Link: Monitoring water quality is a 24/7 process, one that generates mountains of data. CICEET investments helped a Maryland-based company develop the Remote Access Satellite Sensor Link (RASSL), an affordable, data communications system that provides real-time, two-way communication with water-quality sensor platforms in the field.

• Filter Feeders: Excess sediment in coastal waters can block light that underwater plants need to survive. In some cases, filter-feeding shellfish could provide a little clarity. This project is developing a model to predict the effects that bivalves have on underwater plant life in estuaries.

• Data on the Fly: Coastal water quality changes quickly over space and time. To protect human health, coastal managers need accurate tools to monitor these changes as they happen. This project is developing a portable interface to view data and map water quality in the field and on the fly.

• Wetland Remedy: Chlorinated solvents often enter estuaries via ground water. Traditional technologies to address this are time consuming and expensive. This project explored constructed wetlands as a way to treat chlorinated solvents.

• Weathering the Storm: Because pollution travels through ground water into estuaries, the ability to track its flow is essential. This project is developing technology to track ground water and support monitoring and remediation activitie

Learn more

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For more information on this reserve, visit:
nerrs.noaa.gov/ChesapeakeBayMD