



## 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 System (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 fluorimeters, 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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Tools for Clean Water & Healthy Coasts



## CICEET & South Carolina

South Carolina is home to two National Estuarine Research Reserves (NERRs). With more than 130,000 acres, the ACE Basin Reserve is one of the largest undeveloped estuaries on the East Coast, while the North Inlet-Winyah Bay Reserve spans 12,000 acres of salt marshes, tidal creeks, and estuarine waters. Together, these reserves coordinate research, education, and stewardship programs to promote better understanding and management of South Carolina's coasts.

They are also exceptional living laboratories where CICEET-sponsored investigators test solutions to the challenges that coastal resource managers face in rapidly developing landscapes. These scientists and technology innovators develop tools to prevent or reduce the impacts of development on fragile coastal ecosystems that are important economic and cultural resources.



### Investing in South Carolina

CICEET has invested more than \$2.8 million in environmental technology development and application projects related to South Carolina's NERRS sites. Many of these projects address the priority needs of the state's coastal resource managers—from addressing effectiveness of habitat restoration to evaluating the overall quality of coastal waters. Here are some examples:

**Missing Link:** Monitoring water quality is a 24/7 process, one that generates mountains of the data needed to make decisions that protect ecosystems and human health. Moving data from a sensor to a laboratory desktop, however, can be expensive and technically challenging. This project developed a commercially available, two-way system that provides real-time communication with water-quality sensor platforms in the field.

**Red Tide Detection:** Harmful algal blooms (HABs) such as red tide threaten human health and are responsible for millions of dollars in losses in the seafood and tourist industries. This project is developing a technology that uses lasers to detect and identify different species of potentially harmful algae.

**Shining Light:** Nutrient pollution from wastewater and runoff threatens human health and estuarine ecosystems. Accurately monitoring phytoplankton can provide an early warning of increasing nutrient levels in coastal waters. This project is developing an advanced laser fluorescence technique that can detect changes in the condition and composition of phytoplankton communities, pinpointing estuarine changes as they occur.

**Profiler:** To understand the complex ecology of estuarine environments, coastal resource managers need continuous data on water quality conditions such as salinity, temperature, chlorophyll fluorescence, suspended sediments, and dissolved oxygen. This project developed an easy-to-deploy autonomous profiler that can collect and transmit hourly data about the water column. This profiler will soon be commercially available through YSI, Inc.

**Coastal Plain Watershed Network:** In 1998, the Center for Watershed Protection developed the 8 Tools Framework (8TF) for all aspects of watershed planning including zoning, plan review, construction, and occupancy. This project is adapting the 8TF to the specific parameters, issues and challenges related to effective land use planning in the coastal plain.

**The Future of Farming:** Animal agriculture can pollute surface waters. Implementing viable technologies to treat nitrogen and phosphorus in animal waste is essential to maintain a reliable domestic food supply and protect air and water quality. This project applied a new process, Oxygen-Limited Autotrophic Nitrification plus Denitrification, to treat dairy waste.

### Learn more

For more information on these tools, contact Dolores Leonard at CICEET:  
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For more information on these reserves, visit:  
[nerrs.noaa.gov/ACEBasin](http://nerrs.noaa.gov/ACEBasin)  
[nerrs.noaa.gov/NorthInlet](http://nerrs.noaa.gov/NorthInlet)

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