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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Tools for Clean Water & Healthy Coasts

UNIVERSITY *of* NEW HAMPSHIRE

CICEET & Florida

Florida's Apalachicola Bay, Guana Tolomato Matanzas, and Rookery Bay National Estuarine Research Reserves encompass more than 300,000 acres of incredibly diverse habitat—from barrier islands, oyster bars, and salt marsh to one of the few undisturbed mangrove estuaries in North America.

The ecological richness of these reserves makes them exceptional living laboratories where CICEET investigators test solutions to the coastal resource challenges that arise in a rapidly developing landscape. These scientists develop tools and techniques to prevent or reduce development's impact on fragile coastal ecosystems, which are among the most precious economic and cultural resources in the Sunshine State.

Investing in Florida

CICEET has invested more than $4 million in environmental technology development and application projects related to the priority needs of Florida's coastal resource managers. A particular focus has been the development of strategies to monitor and protect water quality. Here are some examples:

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.

Groundwater Tracker: As it moves through soil, groundwater can pick up nutrient pollution and deliver it to coastal waters. To treat this problem, managers must know the source of the contamination. Historically, measuring groundwater has been a time-consuming, labor-intensive process. This CICEET project developed a system that uses radon as a proxy to map groundwater discharge zones in coastal waters.

Containing Copper: Even in small amounts, copper ions can be toxic to many commercially important marine species of fish and shellfish. This project developed the Spectrophotometric Elemental Analysis System, a sensor that can monitor copper levels automatically.

Something in the Air: Traditional septic systems remove only about 23 percent of nitrogen from household wastewater, leaving the rest free to flow into groundwater, streams, estuaries, and coastal waters. This project developed a hollow-fiber membrane system that uses hydrogen gas to convert nitrate into harmless atmospheric nitrogen.

How's the Water? Florida's beaches and coasts are integral to the state's culture and its economy. In recent years, water quality problems such as harmful algal blooms and pollution at swimming beaches have been an increasing threat to these critical resources. A series of CICEET-sponsored projects are developing tools to help detect the warning signs of contamination and the conditions that indicate the coast is clear:

* DNA hybridization assay to identify species of toxic plankton and fecal bacteria quickly and cost-effectively.

* Rapid detection array to provide an early warning system for harmful algal blooms.

* Portable biosensor to identify fecal indicators and harmful algae, and track their sources.

* Fiber-optic biosensor array to provide real-time detection of disease-causing microbes from stormwater runoff and sewer discharge.

* Automated monitoring system for harmful algal blooms that enables researches to track changes in algae populations before they reach the bloom stage.

* Hand-held sensor to enable non-technical personnel to detect Florida's red tide microbe quickly.

Learn more

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For more information on these reserves, visit:
nerrs.noaa.gov/Apalachicola
nerrs.noaa.gov/GTM
nerrs.noaa.gov/RookeryBay