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 shore-lines, 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 & Rhode Island

The Narragansett Bay National Estuarine Research Reserve spans more than 4,000 acres on Prudence, Patience, Hope and Dyer Islands, in Narragansett Bay. The reserve coordinates research, education, and stewardship programs to promote better understanding and management of Rhode Island's coasts.

The reserve is also a living laboratory where CICEET-sponsored investigators can test solutions to the challenges that coastal resource managers face in a rapidly developing landscape. These research 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 for the state.

Investing in Rhode Island

CICEET has invested more than $5.5 million in environmental technology development and application projects related to the Narragansett Bay Reserve. Many of these projects address the priority needs of Rhode Island's coastal resource managers —from cleaning up harmful chemicals and heavy metals in coastal waterways to restoring coastal habitats.

Getting to the Bottom of It: Sediments contaminated by toxic organic chemicals, heavy metals, and other pollutants threaten coastal environments and communities. Traditional approaches to remediation involve dredging, an expensive process that can disperse pollutants into the water as it attempts to remove contaminated sediment, or capping, which contains, rather than treats, the problem. CICEET has invested $2,090,848 in new tools to help stabilize and treat contaminated sediment without dredging. Here are some examples:

- "Ozonator" that uses ozone gas to treat contaminated sediment *in situ* by breaking down pollutants into by-products bacteria can access;

- Multilayered membrane system to trap and treat polluted sediment simultaneously;

- Patented phosphate-based permeable reactive barrier to bind and stabilize pollutants;

- Novel approach to converting contaminated sediments into the manufacture of cement.

Something in the Air: Traditional septic systems remove only about 23 percent of nitrogen from wastewater, leaving the rest free to flow into groundwater, streams, and coastal waters. This project evaluated the effectiveness of using aeration to improve hydraulic and water quality function in the leachfield.

Online Natural Resource-based Planner: To integrate natural resource protection into the planning and development process, communities need information, education, and fast, inexpensive, and relatively low-tech tools. This project is enhancing a GIS inventory with coastal habitat data, and developing an online interactive version of the tool to improve its accessibility.

Restoring Eelgrass: Healthy eelgrass meadows provide habitat for fish and shellfish, protect water quality, and prevent erosion. Unfortunately, significant portions of eelgrass habitat have been lost due to nutrient pollution, dredging, and disease, and restoring this resource has become a priority for Rhode Island's coastal managers. CICEET investments are advancing new tools to help protect and restore eelgrass beds.

- Tissue culture technologies to produce and archive genetically diverse eelgrass for future restoration;

- Innovative, mechanized sled to plant eelgrass seed in large areas, including two plots in Narragansett Bay;

- Geospatial model to forecast optimal restoration sites.

Reining in Runoff: While conventional stormwater treatment systems can remove a significant percentage of particle-bound pollutants in runoff, many are ineffective at screening and capturing dissolved contaminants. This project is developing a water treatment system that uses wood byproducts to filter as much as 90 percent of the organic and inorganic dissolved contaminants from stormwater.

Learn more

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