

Application to join the North Atlantic Coast Cooperative Ecosystems Studies Unit (NAC CESU)

- Who you are

Founded in 1888, The Marine Biological Laboratory (MBL) is an international center for research, education, and training in biology including cell and developmental biology, ecology, microbiology, molecular evolution, global infectious disease, neurobiology, and sensory physiology. The Ecosystems Center is a year-round research center of the MBL. It was established in 1975 as the nation's first center devoted to the field of ecosystem science. The Center played an important early role in understanding and modeling of the earth's carbon cycle and the role that human-driven changes to land use and fossil fuel emissions play in controlling the composition of the atmosphere and responses of natural ecosystems. The Center now has field and modeling programs across the globe from Arctic tundra, lakes and rivers, to coastal ecosystems of eastern North America to the forests and soybean farms of the Brazilian Amazon. The Center's work tests how climate and human activities shape the earth's element cycles, the way those cycles interact with plants and animals and how this understanding can be translated into actions that reduce environmental impacts.

The Ecosystems Center pioneered many important and novel methods for manipulating ecosystems and tracing ecosystem responses, such as the first experimental soil warming at the Harvard Forest, the first whole-ecosystem additions of the stable nitrogen isotope ^{15}N in an Arctic river, nitrogen additions to saltmarshes, etc. The Ecosystems Center is a global leader in long-term global change research, and hosts two Long-Term Ecological Research (LTER) sites, one in Arctic Alaska at Toolik Lake and one in coastal Massachusetts at Plum Island. The Ecosystems Center also developed a variety of ecological models to improve our ability to predict future ecosystem change.

- What is your mission

The Ecosystems Center's mission is to investigate the structure and functioning of ecological systems and to predict their response to changing environmental conditions, to apply the resulting knowledge to the preservation and management of natural resources, and to educate both future scientists and concerned citizens.

- Where are your offices located?

The Ecosystems Center is housed in the 32,000-sq. ft. Starr Building, designed specifically for the Center built in 2001. Our address is: Starr, Marine Biological Laboratory, 7 MBL St, Woods Hole, MA 02543.

- What expertise can your agency or University contribute to the NAC CESU consortium?

The MBL's Ecosystems Center has expertise in field ecosystem ecology and ecological modeling aimed at understanding the fundamental biogeochemistry and function of ecosystems and how ecosystems will respond to changes in human activity and climate. The Center applies this knowledge to manage, protect and restore ecosystems. The Center makes these science-to-policy connections on topics that range from ecosystem carbon sequestration ability to watershed eutrophication to overfishing.

- Who are the individuals in your program that you anticipate will be active in NAC CESU projects?

We anticipate the following Ecosystems Center principal investigators would be potentially active in NAC CESU projects: Zoe Cardon, Linda Deegan, Anne Giblin, John Hobbie, Jerry Melillo, Christopher Neill, Bruce Peterson, Jim Tang, Edward Rastetter, Gus Shaver, Ivan Valiela, Joseph Vallino. In addition, the following scientists from the Bay Paul Center of MBL with expertise in molecular microbial ecology and evolution would also potentially be active for the NAC CESU: Linda Amaral Zettler, Julie Huber, Mitch Sogin, Sheri Simmons, Anton Post.

- How can your institution or University contribute to the NAC CESU Mission and Vision (see <http://www.ci.uri.edu/naccesu/>)?

We can support the NAC CESU Research Mission in several areas. First, we conduct active research in the North Atlantic Coast biogeographic region. We lead research at the Plum Island Long-term Ecological Research (LTER) site at Plum Island in coastal Massachusetts. Results of research from this site are used to support the preservation, management and restoration of North Atlantic Coast ecosystems and cultural resources. Second, we conduct research at other locations that is relevant to understanding function and managing coastal lands. For example, our collaborative research in coastal carbon and nitrogen management on Cape Cod is being used to develop a protocol to calculate the carbon credit for coastal restoration and nitrogen management used by land managers and policy makers. In this project, we frequently collect feedback from stakeholders and monitor the success of coastal restoration efforts. Third, we can identify and describe critical research needs to protect ecosystem structure and function on federally managed lands. We can also help to establish research priorities based on the needs of federal resource managers such as the conservation and restoration of coastal wetlands by decreasing nitrogen loading and increasing the carbon sink capacity.

We can also support the Technical Assistance Mission of the NAC CESU by identifying the critical technical assistance needs of federal land managers. For example, we have a strong modeling ability, while developing a high-resolution, process-based earth system model is critically needed for federal land managers to monitor and predict the change in ecosystems. We have developed cutting-edge technology to monitor greenhouse gas (CO₂, CH₄, and N₂O) emissions from land and coastal ecosystems. We can provide technical assistance, training, planning support, and other needed services for federal resource managers to monitor the greenhouse gas emissions and their changes in the lands.

We will support the cooperative Education Mission in several ways. We teach the Semester in Environmental Science, a 15-week-long off-campus program for undergraduate students recruited nationally. The SES program focuses on coastal ecosystem ecology and management. Ecosystems Center scientists serve as adjunct professors and advisors in the Brown University-MBL Graduate Program, members of doctoral committees, and mentors for postdoctoral scientists and undergraduate interns. The Center staff also takes part in a range of community outreach activities to increase public understanding of science. We have strong connection with two federal agencies, the USGS Woods Hole Coastal and Marine Science Center and NOAA Northeast Fisheries Science Center, both located in Woods Hole.

- Who is the NAC CESU point of contact for your agency or University (include email, phone, fax, mailing address)?

Technical Representative:
Jim Tang, Ph.D.
jtang@mbl.edu
Phone: 508-289-7162
Fax: 508-457-1548
The Ecosystems Center
Marine Biological Laboratory
7 MBL St.
Woods Hole, MA 02543

Cooperative Agreements Representative:
Kelly Holzworth
kholzworth@mbl.edu
Phone: 508-289-7471
Fax: 508-457-1548
The Ecosystems Center
Marine Biological Laboratory
7 MBL St.
Woods Hole, MA 02543