

Cornell University
Prospective Partner Synopsis

North Atlantic Coast (NAC)
Cooperative Ecosystem Studies Unit (CESU)
August 2010

Who You Are?

Cornell University is a private endowed university located in New York State USA. As a member of the Ivy League and a partner of the State University of New York (SUNY), Cornell is also the federal land grant institution of New York State as it administers colleges of agriculture and life sciences, veterinary medicine, human ecology, and industrial and labor relations with New York's SUNY system and is responsible for the state's extension system.

Cornell is comprised of 14 schools and colleges, seven undergraduate units, and four graduate and professional units located in Ithaca, New York; two agricultural experiment stations in Geneva and Ithaca, New York; several field stations and facilities throughout the state; and two medical graduate and professional units in New York City and Doha, Qatar. The Cornell University Library ranks as one of the 10 largest academic libraries in North America. Cornell is one of only two universities in the USA that contributes to all four national land grant, sea grant, space grant, and sun grant programs, established by acts of the U.S. Congress in 1862, 1966, 1988, and 2003, respectively.

Currently, there are over 3,200 professorial faculty and senior academic staff delivering over 4,000 courses; 9,000 professional and administrative staff; and 20,000 students, both undergraduate and graduate. Each year, Cornell confers more than 3,000 Bachelor's degrees, 1,500 Master's degrees, and 400 Doctoral degrees.

What is your mission?

Cornell has been described as "the first American university" because of its founders' revolutionarily egalitarian and practical vision of higher education, and its dedication to its land grant mission of outreach and public service. The first principle governing this institution was that it would be "a place where the most highly prized instruction may be afforded to all regardless of sex or color." In Ezra Cornell's words, "...I would found an institution where any person can find instruction in any study..."

Potentially, there are at least two colleges at Cornell that can contribute to the NAC CESU mission and vision: Agriculture and Life Sciences (CALS) and Engineering. With respect to CALS, academic priorities are focused on applied social sciences, natural resources and environmental sciences, and the new life sciences, all within the context of the Land Grant mission. The College of Engineering seeks to train students to excel in their particular field of study over a broad spectrum of engineering disciplines, develop responsible leaders committed to excellence, and create a sustainable future through innovative solutions to complex problems. All colleges, departments, and faculty who can potentially contribute to NAC CESU take an interdisciplinary

and collaborative approach to research, education, and extension for the purpose of training the leaders of tomorrow to address the challenges facing society, locally and globally.

Where are your offices located?

The main campus of Cornell University is located in Ithaca, New York USA. The Weill Cornell Medical College has campuses in New York City and Dohar, Qatar. Cornell owns and operates a number of facilities throughout the world, most notably the Arecibo Observatory in Puerto Rico; the Shoals Marine Laboratory in conjunction with the University of New Hampshire on Appledore Island off the Maine-New Hampshire coast; the Cornell University Agricultural Experiment Station (Ithaca, New York) and the New York State Agricultural Experiment Station (Geneva, New York); the Cornell Laboratory of Ornithology in Ithaca, New York; and a number of agricultural and environmental field research stations in New York State, Dominican Republic, and Peru, among others.

What expertise can be contributed to NAC CESU consortium?

The University is renowned for its leadership in an extraordinary range of fields of study. Strengths relevant to the CESU system include agricultural sciences, atmospheric sciences, biological engineering, civil engineering, development sociology, ecology and evolutionary biology, environmental engineering, environmental sciences, life sciences, natural resources, and plant sciences. The Cornell Center for a Sustainable Future (CCSF) is a focal point for advancing multidisciplinary research of relevance to NAC CESU. Emphasizing energy, environment, and economic development, CCEF cultivates innovative collaborations within and external to Cornell University to foster a sustainable future for society.

Who are the individuals potentially active in NAC CESU?

There are many professorial faculty, senior academic staff (research associates and extension associates), and students (undergraduate, graduate) who are potentially active in NAC CESU. Students at Cornell are of high quality and diversity, serving to potentially strengthen the federal workforce in the area of natural resources and the environment. Specific names and individual program descriptions are available upon request. Highlights from a small sample of faculty programs are described below relevant to the seven foci of NAC CESU.

Generally, these individuals advance our state of knowledge of aquatic, atmospheric, and/or terrestrial systems, in rural and urban environments, using theoretical and applied approaches, and at various scales of space, time, and complexity. Research productivity of faculty drives our educational and extension programs. Individuals are committed to the integration of new knowledge in academic course curricula and the transfer of research-based knowledge in all cooperative extension and outreach programs. Many individuals work collaboratively with their counterparts in federal, state and local government, non-government organizations, and other academic institutions. Several on-going faculty programs are directly linked to the federal agency partners currently affiliated with the NAC CESU.

How can your institution contribute to NAC CESU mission?

Listed below are the seven foci articulated in the NAC CESU strategic vision. For each focal area, a brief summary is provided on how Cornell University can contribute to the mission of NAC CESU. This summary is not exhaustive but indicative of the many ways in which Cornell University can serve to advance our understanding and management of coastal ecosystems under the auspices of NAC CESU.

1 - Nutrient enrichment and contaminants:

Several faculty programs focus on the fate and transport of diffusely distributed pollutants in agronomic and environmental systems, primarily at watershed scale in which outflows eventually contribute to enrichment or contamination of coastal ecosystems. Faculty expertise and experience exists at Cornell for addressing each of the specific research areas listed for this focal area. For example, there are a variety of predictive ecosystem-based and hydrology models at Cornell used to characterize nutrients and contaminants as a function of land management practices. Other contributions can also be made with respect to behavior of contaminants at the soil-water interface that emphasize phyto- and zootoxicity of heavy metals in urban and rural environments based on a broad spectrum of land use practices.

2 - Landscape ecology and maintenance of habitat diversity:

Landscape ecologists at Cornell have diverse programs in urban, aquatic, and terrestrial ecosystems. Some programs are dedicated to the characterization, identification, and biological control of invasive species, primarily plants and insects, at multiple spatial scales. In collaboration with academic and agency partners specializing in resource inventory and analysis, the dynamics of invasive species in relation to land use/land cover change is emphasized, while others focus on the ecological management of plant invasions using biological control measures. Some facets of research and extension in this area are coordinated by the Cornell University Ecology and Management of Invasive Plants Program. Other programs focus on the conservation genetics and evolutionary genomics of marine and estuarine biota in the coastal zone of eastern USA with emphasis on population genetics of mollusks and phylogeography of marine parasites.

3 - Restoration ecology:

Selected faculty programs at Cornell take an interdisciplinary approach to inventory, monitor, and restore ecosystem function of urban and human-impacted landscapes. Faculty programs in resource inventory and analysis map critical wetland and aquatic habitats using aerospace remote sensing and geographic information systems using methods applicable to several foci of NAC CESU. Such inventories serve as a baseline for long-term monitoring and functional assessment of impacted, restored, and managed coastal and estuarine ecosystems. In one such study, in collaboration with the Hudson River National Estuarine Research Reserve Program (NERRS-NOAA), faculty inventory and monitor submerged and emergent aquatic vegetation using a citizen-based volunteer monitoring program and collaborate with aquatic ecologists to conduct functional assessments. The methods used in this study can be applied directly to coastal ecosystems and habitats throughout the NAC CESU region.

4 - Coastal geomorphic processes:

Expertise in environmental engineering and environmental science programs at Cornell can be applied to characterize environmental fluid mechanics and ecohydrology in coastal zones. These programs can focus on assessing turbulence and gas transfer at the air-water interface, monitoring subsurface flows in tidal areas, evaluating the impact of submerged and emergent vegetation on flow and mass transport, and determining the impact of land management practices on the source, fate, and transport of sediments and nutrients in terrestrial watersheds and associated aquatic systems (estuarine, lacustrine, marine, palustrine, riverine). Of interest to Cornell faculty is the advancement and integration of our knowledge with respect to characterizing such coastal ecosystem processes in relationship to the structure and function of human-impacted natural resource communities and cultural resources.

5 - Monitoring and modeling long-term changes:

Faculty programs at Cornell develop and use standardized methods to characterize and assess aquatic and terrestrial ecosystems impacted by management practices or environmental threats, actual or perceived. Field-based observations and measurements and/or complex process-based simulation models are used to develop resource management scenarios and evaluate impacts of management decisions. For example, faculty and scientists associated with the New York Cooperative Fish and Wildlife Research Unit (partnered with selected Cornell academic departments, NYS Department of Environmental Conservation, USGS-BRD, US Fish and Wildlife Service, and other organizations) are developing and evaluating adaptive management strategies and predictive models to integrate environmental quality concerns, socioeconomic values, and aquatic resource management goals. Such approaches currently focus on fisheries and aquatic resources in the northeastern USA to understand the dynamics of watersheds and large aquatic systems within the context of human land use and development.

6 - Natural and cultural resources and heritage:

Cornell has significant expertise in advancing our understanding of the human behavior aspects of natural resource management and policy. This expertise is multi-dimensional and highly integrative between the social and biophysical sciences at Cornell. Typical faculty expertise is quite diverse, ranging from resource management and policy, to environmental science education in urban settings, to complex connectivity and interactions between human and environmental systems with focus on indigenous peoples. Cornell contributions to this focal area can be directed toward developing sustainable and culturally significant resource management practices, identifying and mapping natural and cultural resources, and assisting in the development of working partnerships with stakeholders, resource managers, and educators.

7 - Data and information exchange:

The following units at Cornell University can provide significant contributions to the NAC CESU data repository and information system, technical assistance to federal scientists and managers, participation on the geo-spatial expert team, and strengthening the focus area on the study and management of cultural resources associated with coastal ecosystems.

The Institute for Resource Information Sciences (IRIS), in the Department of Crop and Soil Sciences, advances the characterization, understanding, and evaluation of agronomic and environmental systems through the application of resource inventory, aerospace remote sensing, geographic information systems, and related geo-spatial information technologies. Faculty, staff, and students affiliated with IRIS have expertise in remote and proximal sensing, resource inventory and analysis, geographic information systems, global navigation satellite systems, and spatial database development and integration. Contributions to the NAC CESU can be in the area of inventory and monitoring of submerged aquatic vegetation in estuarine systems, mapping emergent wetland vegetation, advancing wetlands inventory methods and applications, and characterizing land use/land cover change in coastal environments.

The New York Cooperative Fish and Wildlife Research Unit (NYCFWRU) and the Human Dimensions Research Unit (HDRU), in the Department of Natural Resources (DNR), also have significant interest and expertise in natural resource data and information exchange. The goal of DNR is to strengthen society's capacity to conserve biological diversity and sustain resilient social-ecological systems in the face of intensive land use practices that lead to urbanization, climate change, and habitat fragmentation, among others. Faculty programs relevant to NAC CESU foci include fishery and aquatic sciences; spatio-temporal dynamics of aquatic and terrestrial ecosystems; wetland ecology, hydrology, and management; and the human dimensions of natural resource management of aquatic ecosystems.

Lastly, New York Sea Grant has several thematic areas of direct interest to NAC CESU, including aquatic invasive species; coastal communities, economies, hazards, and processes; fisheries; and seafood science and technology. This state-wide network of integrated research, extension and education programs is "Bringing Science to the Shore" that serves to sustain and promote wise stewardship of coastal resources for the 3,400 miles of varied coastline in New York, the only state in the nation bordering both the Great Lakes and the ocean.

In summary, Cornell University can contribute significantly to the mission and vision of the NAC CESU in most, if not all, topical areas described in the unit's strategic vision for the future. We look forward to the opportunity to collaborate on research, education, and extension programs of mutual interest and need as defined by the NAC CESU partnership and stakeholders.

Who is NAC CESU point of contact for Cornell University?

Jeffery D. Corbin
Senior Grant and Contract Officer
Office of Sponsored Programs
373 Pine Tree Road
Cornell University
Ithaca, NY 14850-2820

jdc37@cornell.edu
p. 607-255-6306
f. 607-255-5058