

**NORTH ATLANTIC COAST COOPERATIVE ECOSYSTEMS STUDIES UNIT
PARTNERSHIP APPLICATION FROM BATES COLLEGE**

BATES COLLEGE: AN OVERVIEW

Founded in 1855 by abolitionists who believed strongly in freedom, civil rights, and the importance of a higher education for all who could benefit from it, Bates College is a highly selective, coeducational, nonsectarian, residential college of the liberal arts and sciences. Nationally recognized for academic rigor and the quality of the educational experience it provides, the College consistently ranks in the top 25 liberal arts colleges in national surveys of overall quality. Faculty teach all courses, and 100 percent of our 171 dedicated, tenured or tenure-track scholars hold a doctorate or a terminal degree. Bates' 1,745 students may pursue any of 32 majors leading to the B.A. or B.S. degree, and all majors now require a thesis or capstone research experience. One quarter of Bates students major in the sciences and mathematics, and the College is one of the top 50 producers of baccalaureate-degree holders who go on to earn Ph.D.s in science or engineering. Bates is nationally recognized for the qualities of the educational experience it provides. It is committed to academic rigor and to assuring in all of its efforts the dignity of each individual, and access to its programs and opportunities by qualified learners. Bates offers a curriculum and faculty that challenge students to attain intellectual achievements and to develop powers of critical assessment, analysis, expression, aesthetic sensibility, and independent thought.

Since 1990 Bates has had a Committee on Environmental Responsibility and evolving sustainability policies and programming, leading to Bates being listed as the only liberal arts college with a top score in the Princeton Review Green Report Card. Bates' Environmental Studies Program, an interdisciplinary program rather than a department, was instituted in 1996 to combine perspectives on the social sciences, natural sciences, and humanities. Within the natural sciences, the departments of Geology, Biology, Chemistry, and Physics all have rich course offerings emphasizing environmental topics.

<http://www.bates.edu/ENVR.xml?dept=ENVR>

Bates College is located in Lewiston, Maine, on the Androscoggin River and 25 miles from the Atlantic shore. Lewiston and its neighboring city of Auburn make up the second largest community in Maine with a combined population of about 65,000. Additionally, Bates manages the Bates-Morse Mountain Conservation Area (BMMCA), over 600 acres of coastal property in Phippsburg, Maine, for educational purposes and scientific research. The property extends from the Sprague to the Morse Rivers, and provides access to Seawall Beach, the largest undeveloped beach and dune complex remaining in Maine. This beach is a nesting site for two endangered bird species: the piping plover and least tern. A nearby field station, the Bates College Coastal Center at Shortridge provides meeting space as well as living quarters for student and faculty researchers; it could serve as a meeting site for NAC CESU partners and project collaborators.

Collaborative research projects utilize the impressive array of resources and equipment on and beyond the Bates campus, including shared labs for environmental geochemistry, sedimentation, and geographic information system (GIS), as well as instruments within the labs of individual faculty. In January 2007, Bates opened its shared Imaging and Computing Center, a manifestation of the College's commitment to interdisciplinary research and teaching.

<http://imaging.bates.edu/origin/> The Imaging and Computing Center houses the GIS lab and equipment such as two Trimble GPS units and four Nikon microscopes (upright, inverted, modular focus, and stereo) each outfitted with vibration isolation tables and with image capture and analysis systems, three scanners (flatbed, graphic arts, and slide and film), and specialty printers. Selected other major equipment within various labs at Bates includes a stable isotope ratio mass spectrometer (IRMS) interfaced to an elemental analyzer (EA) and a gas chromatograph (GC) via a combustion interface (EA/GC-C-IRMS), gas chromatograph with a flame ionization detector (GC-FID), inductively coupled plasma optical emission spectrometer

(ICP-OES), Dionex ICS-2000 ion chromatograph, a microwave digester, a particle size analyzer, UV/vis spectrophotometers, a fluorometer, high-field nuclear magnetic resonance spectrometer, scanning electron microscope with attached EDS, microplate reader, anaerobic chamber, telemetry instrumentation, electrophoresis units, incubators, ultra and high speed centrifuges, -80° C freezers and liquid nitrogen cryotanks. We also have a wide variety of field sampling equipment including sediment coring devices, hydrolab multi-probes, dataloggers, Garmin GPS units, an acoustic seismic system including Datasonics Chirp towed fish, boats, and automated weather stations. Bates fosters collaboration and cooperation, and any faculty member can acquire access to any of these pieces of equipment to carry out a research project.

Bates faculty and their students have long been active participants in many interdisciplinary collaborations in our local and regional communities and with colleagues at various research institutions. This research has been funded through federal grants from agencies including the National Science Foundation, the National Institutes of Health's IDeA Network of Biomedical Research Excellence, the U.S. Fish and Wildlife Service, the U.S. Geological Survey, and the Department of Energy. Bates faculty and students also contribute to the larger federal, state, and non-profit ecosystem research community throughout Maine, including at the Department of Marine Resources' Lamoine Water Quality Lab and its lab in Boothbay Harbor, the Water Research Institute in Orono, and Acadia National Park.

EXPERTISE BATES CAN CONTRIBUTE TO THE NAC CESU CONSORTIUM

At Bates College we have a substantial number of faculty whose research, teaching, and publications emphasize analysis of the environment in the broadest sense. Our faculty's work spans atmospheric, terrestrial, aquatic, and socio-cultural systems over times ranging from years to millennia. We have scholars specializing in freshwater and saline water bodies, coastal forests, environmental toxicology, the economic impact of dam removal, the history of human settlement in coastal areas, conservation of estuaries, changes in trophic interactions, the effects of climate change on systems, and the influence of atmospheric deposition on terrestrial and aquatic ecosystems. The tools used vary from historical analyses of sediment and documents to economic analyses, geographic information systems, stable isotope analyses of biological and geological materials, descriptions of population and community dynamics, and biogeochemical analyses of soils, sediment, and water. Examples of faculty projects can be found at <http://www.bates.edu/x149632.xml> and <http://www.bates.edu/x174222.xml>

Bates faculty and students have been heavily involved in interdisciplinary research on a range of topics, many of which are relevant to coastal ecosystems. For example, members of the North Atlantic Research Group have developed both an interdisciplinary project at Seguin Island on the Maine coast and more diverse activities that have been funded by the National Science Foundation, such as reconstructing climates from lake sediments, analyzing climate shifts using growth data from clam shells, and examining the effects of invertebrate fisheries on associated animals and birds that rely on coastal Maine mudflats for food. A number of Bates faculty have made concerted efforts to investigate problems with implications for resource management, such as the vitality of intertidal invertebrate communities, the re-establishment of food-web dynamics following the removal of ditches in coastal wetlands, the stability of coastal dune systems, and the impact of atmospheric deposition on the streams of Acadia National Park. Within this range of projects our faculty have supervised students completing senior theses in conjunction with community partners in federal and state agencies, as well as local non-profit organizations. All of the faculty listed below have conducted collaborative projects and would welcome future joint projects with NAC CESU partners, whether through research initiated by Bates or in conjunction with ongoing activities and interests of the varied partners.

INDIVIDUALS WE EXPECT TO BE ACTIVE IN NAC CESU PROJECTS

Holly Ewing, Environmental Studies

Beverly Johnson, Geology

Michael Retelle, Geology

Lynne Lewis, Economics

William Ambrose, Biology

Michael Jones, History

Bruce Bourque, Anthropology/Archaeology

Laura Sewall, Director of the Bates-Morse Mountain Conservation Area

HOW BATES CAN CONTRIBUTE TO THE NAC CESU MISSION AND VISION

As described above, Bates has a number of faculty with research and teaching activities centered on the North Atlantic Coast, and several are already conducting research, often in collaboration with students and colleagues from other institutions, on systems under federal management. Bates would bring faculty and students eager to engage broadly with scientists from both academic institutions and federal agencies. Students within the Environmental Studies program are required to complete a 200-hour internship, and we have found that our students have helped maintain partnerships between Bates faculty and organizations such as the EPA, the Maine Geological Survey, Acadia National Park, Maine Audubon, and a variety of both commercial and nonprofit groups. Results from existing and future research projects have and would continue to provide resource managers with current scientific information about system status and function. As skilled educators our faculty are also keenly aware of the importance of clear communication about scientific results, and they invest considerable time and effort in communicating their research results to managers, policy makers, and citizens.

In addition to providing their obvious technical expertise and continuing to conduct research with management implications, Bates faculty also bring to the NAC CESU their collaborations with federal and state agencies and connections with other conservation organizations. Our faculty's expertise is frequently requested by nonprofit organizations and, as coalitions of organizations undertake ever more large-scale management initiatives, the breadth of our faculty's experience and connections has the capacity to serve our partners in federal agencies in both constructing further coalitions and in broadly disseminating information.

We already have several contacts with federal agencies and would like the opportunity to engage more fully with scientists in the region and with resource managers of other agencies. For example, in 2006 Ewing was part of a Physical Sciences Research Scoping Workshop to identify research opportunities and needs within Acadia National Park. She has also done research within the park on the influence of atmospheric deposition on soil and stream water chemistry and has conducted a training session for the park's interpretive rangers. Joining the NAC CESU would enable additional faculty at Bates to develop more extensively collaborative, interdisciplinary projects with partners from participating agencies and the larger academic community and to contribute further to addressing issues in the region.

POINT OF CONTACT

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