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Integrating Community-Based Learning and Research into Environmental Science Courses

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Humans are influencing ecosystems to a greater degree than ever before in human history, and many of these effects are impacting the ability of ecosystems to provide benefits that humans value, including food and clean water. Environmental scientists can play vital roles in mitigating these effects, and ensuring sustainable interactions between people and the environment in the future. In my first three years at Brown as the Peggy and Henry D. Sharpe Assistant Professor of Environmental Studies and Biology, I have developed three courses that introduce students to natural and social science approaches and knowledge bases needed to help develop such solutions. In addition to enabling students to develop a command of key subject areas for environmental problem-solving, I also endeavor to connect our work with real-world environmental policy and management issues, as described below. This pedagogical approach is part of my longer-term goal of integrating community-based learning and research into the environmental sciences, an aim which builds on decades of activities within Brown's Center for Environmental Studies, as well as more recent efforts by the Swearer Center for Public Service to promote engaged scholarship by both faculty and students at Brown (see the piece by Kerri Heffernan in this issue).

In *Marine Conservation Science and Policy* (ENVS 1455), which I am teaching for the third time in Spring 2010, students develop an interdisciplinary understanding of ocean ecosystems and how human communities are connected to them socially, economically, and ecologically.

Participating students – primarily advanced juniors, seniors, and graduate students – are expected to have background in related fields, including biology, geosciences, sociology, economics, or political science, beyond the intermediate level. Through lectures, discussions, written and oral presentations, students have opportunities to integrate the scientific and human dimensions of marine conservation science and policy. We analyze the current status, trends, and threats to ocean ecosystems; the range of individual-based and institutional solutions to mitigate these threats; and a series of case studies from this region and other places in the world's ocean and coastal areas. Students hone their skills in synthesis and communication of science for varied audiences, including policymakers.

Group projects, as well as individual writing assignments, are core elements of ENVS 1455. In past years, I've solicited project ideas from colleagues in government and non-government organizations in the region, and then had students choose among those topics and develop interdisciplinary analysis and recommendations that incorporate both science and policy knowledge. This semester, we will do something similar, but with a real 'client', the Northeast Regional Ocean Council (NROC; <http://community.csc.noaa.gov/nroc/>). NROC is the regional ocean governance institution for New England, and is composed of state and federal agency representatives from Maine to Connecticut. With the recent release of a national draft ocean policy (<http://www.whitehouse.gov/ADMINISTRATION/EOP/CEQ/INITIATIVES/OCEANS>), NROC is seeking scientific input on how to most effectively pursue the opportunities and responsibilities associated with this policy. Working in teams, students will produce policy briefs that focus on different aspects of the natural and social science needed to inform regional ocean management, and have opportunities to interact with ocean management practitioners throughout the course. This experiment will no doubt create as many questions as it answers, and my colleagues at NROC are open to hosting students for follow-on work during the summer, if appropriate.

In Fall 2009, I developed an intermediate-level course, *Coastal Ecology and Conservation* (ENVS 0455), in collaboration with Prof. Mark Bertness, that exposes students to the ecological knowledge and theory needed to engage in interdisciplinary research and coursework in marine conservation science. Here, too, we emphasized integration of fundamental knowledge with conservation challenges. Students were exposed to these issues firsthand through a field trip to the Cape Cod National Seashore. I anticipate that we will expand the field component of this course in future years.

Starting in Spring 2011, I will teach the *Global Change Senior Seminar* through Environmental Studies. This senior seminar will enable students to place their research in the context of environmentally relevant policy and practice. The course will be required for the first cohort of Brown Environmental Fellows, a new program that will introduce undergraduate environmental scientists to the dynamic interface between environmental science, policy, and

practice. Working with Brown faculty and environmental practitioners, fellows will gain direct experience pursuing environmental research in the context of regulatory and conservation practice. In the seminar, students will lead sessions focused on the science and policy elements of their independent research projects. The seminar also will offer students opportunities to hone vital professional skills, e.g. how to communicate scientific findings to the media and policy audiences; oral presentation skills, and tips on professional interactions. While the course is required of all Brown Environmental Fellows, it also is open to other seniors doing environmentally relevant projects. The course is supported by the Henry David Thoreau Foundation, the Swearer Center (through a grant from the Silverton Foundation), the Environmental Change Initiative, and the Center for Environmental Studies. Applications for the senior seminar will be available at <http://www.brown.edu/Research/ECI/activities/bef.html> later this semester.

I see all of these courses as works-in-progress, and look forward to continued interactions with others in the Brown community about how to effectively incorporate community-based research and teaching into our curriculum.