Smith College Environmental Research Group:
Seeking Answers to Critical Environmental Problems

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This proposal seeks support for the creation of student-faculty Environmental Research Groups to help solve critical environmental problems and through this to bring Smith College to the forefront of environmental education. Environmental education is critical to ensure that we as a society make the right decisions to ensure our continued health and prosperity. World population growth and economic development is driving an ever increasing rate of resource consumption that is causing energy, toxic waste, water resource, and global climate change issues that not only threaten future economic growth, but could threaten our very existence as well. Our future is dependent on finding answers to real environmental questions. Effective solutions can only come from cooperative interaction between the disparate fields of science, engineering, and public policy. Scientists provide the process-level studies that lead to understanding the problem, while engineers design solutions, but without good public policy nothing will happen.

Smith College is uniquely positioned to put women into leadership roles to address these critical environmental problems. The new Picker Engineering Program together with strong science and policy programs provide the basis for the necessary integrated interdisciplinary approach; the challenge is how to bring together the necessary faculty and students together. The answer lies in creating multidisciplinary Environmental Research Groups (ERGs). The idea is to bring groups of students and faculty together to attack specific environmental problems. Each group would consist of students and faculty from each of three critical areas: science, policy and engineering. The approach would be patterned after the highly successful Keck Geology Consortium (KGC) research project where students from different consortium schools join together in the summer to do field work on a specific geologic problem, then return to their home institution during the following academic year to analyze samples and write a formal report. They all come together again the following spring at a symposium to present their results. Participants in KGC projects benefit greatly from the diverse perspectives brought by students and faculty from different institutions. While the proposed ERGs could also involve students and faculty from other institutions or government scientists and regulators, their diversity will be disciplinary and their power will come from uniting these three different groups into a single, united, task force. Like the KGC projects, ERGs would include a significant field component. Shared field experiences will help unify the task force, thus facilitating communication and the exchange of ideas between members working in different fields.

The ERGs will enhance the opportunity for students to find meaningful educational experiences outside the classroom and will help to integrate research opportunities into the curriculum. Projects will be structured in a way to help create "pathways to research." Research assistantship positions will be used to introduce first and second year students to research methods. Students in these positions will be paired with upper level students. They will serve as assistants to the upper level students both in the field

and in the lab. More importantly, the assistants will learn firsthand how research is done and will learn techniques and gain the self-confidence needed to themselves become successful researchers.

The plan is to field 2-3 projects each year with 6-12 students and 3-6 faculty per project. The scope of the research problems will likely require that each project run for several years. This would give students who first serve as research assistants the opportunity to advance within the project to full-fledged student researcher. Projects would not be limited to the local area. International projects will be encouraged, as they will likely broaden the research diversity. For example, solving environmental problems in Africa will likely require additional expertise in cultural anthropology. Projects will likely involve cooperation with other researchers and could involve students from other institutions as well as government officials.

A critical component to this proposal is an environmental symposium to be held in the spring semester where students and faculty present the results of their research. The symposium will be open to the public and will include outside experts as invited speakers. The symposium will serve to help educate the entire Smith community to the issues surrounding important environmental problems.

Smith College Environmental Research Groups working to solve real environmental problems will bring national and international attention to our program. They will help advance Smith as a national leader in environmental education. Given the importance of environmental issues in today's world we should not pass on this opportunity.

EXAMPLE PROJECTS

Water Resource Management in sub-Saharan Africa – The sustainability of fresh water resources is a critical issue in this region and the effects of global climate change make this region increasingly susceptible to draught. In this project students and faculty would evaluate the current water resources and determine how best to manage and develop the resource in light of the pressure for increased economic development.

Impact of Atmospheric Deposition of Mercury in Forest Ecosystems – The increasing demand for energy is causing continued increase in coal burning, primarily to produce electricity. Mercury is released to the atmosphere during the combustion process. This atmospheric mercury is deposited in remote areas where it is involved in a complex series of biogeochemical reactions that can ultimately cause mercury contamination in fish and other wildlife in undeveloped forest ecosystems. This project would evaluate the scope of the problem and develop policies to minimize the impact of coal burning.

Impact of Climate Change on New England Hydrology - Models of global climate change can be used to predict changes in regional precipitation patterns. This project would couple these models with regional hydrogeologic datasets using a Geographic Information System (GIS) database to make predictions on changes in the hydrology of New England rivers and streams. This would include changes in flood frequency and low flow characteristics.