Should Smith College Have an Environmental Major?

Abstract:

The impact of the human species on the world today is remarkable and unprecedented. Since World War II we have altered our environment to an alarming extent. The consequences of our actions, whether global warming, loss of biodiversity, or changes to the air, water and soil, are complex and impossible to predict with complete accuracy. These issues are further complicated by political, economic, and scientific factors which change on a regular basis. Putting all of these issues together in an attempt to find solutions is arguably the most important task of our time. Many colleges have developed environmental science and/or studies majors to help students that address these complexities. Smith College, one of the leading liberal arts colleges in the nation, does not have a major in the environmental field. Reasons for not developing such a major, as voiced by members of the steering committee of the Environmental Science and Policy Program at Smith, mainly center on two issues: the conflict between having enough depth in a discipline while at the same time addressing the necessary breadth the subject requires, and the lack of faculty to implement such a program. Five colleges with environmental programs are examined here to determine how they have solved these two problems. These programs are compared to each other and to Smith College, and offer possible ways of approaching the development of environmental science as a separate and distinct major.

Introduction:

Smith College is the largest women’s liberal arts college in the United States. It offers 39 majors, including 8 interdepartmental majors. It recently developed the first
engineering program at a women’s college and plans are in place for expanding the campus with a science and technology building. Smith is a dynamic, progressive institution and considered a leader in liberal arts education.

The Environmental Science and Policy Program at Smith College began in 1996 and offers two minors, one in environmental science and policy and the other in marine science. One goal of the program is to increase awareness of environmental issues throughout the Smith community. The program is an active one: it serves as a channel for information about environmentally related events and opportunities, sponsors speakers for its lunch bag series, and promotes student-led environmental organizations. The ES&P Program is a visible reminder for the Smith community that environmental issues are important and concern everyone.

Other colleges have responded to the need for environmental awareness by incorporating the subject into environmental courses, majors, minors and concentrated areas of study into their curricula. Five such colleges are outlined here and compared to Smith College and to each other. In doing so, two main objections to developing an environmental major at Smith will be addressed: the difficulty of developing a major that centers on a topic that is by nature interdisciplinary and broad while simultaneously providing depth of knowledge in one area, and the acquisition of an adequate number of professors to teach the courses required for a major.

Methodology:

Most of the information presented here came from college websites. Additional information was gathered through emails from individuals at these colleges. Five
colleges were used as comparisons to Smith. Four are considered similar to Smith and are small, private, liberal arts, all-women colleges: Bryn Mawr, Mt. Holyoke, Wellesley, and Barnard. All four are in the northeastern United States and are considered to be similarly selective in their admissions. The fifth college, Middlebury College in Vermont, was selected because of its similar size to Smith and its well known environmental program.

Information necessary to answer the following questions about each college was collected:

1. Does the college have an environmental major, a minor, or both?
2. Is this major or minor considered environmental science or environmental studies?
3. Is this major or minor considered inter-departmental?
4. Does this major or minor require a concentration or focus?
5. What are the course requirements for each major or minor?
6. Is there an emphasis on either the natural science or social sciences/humanities?
7. Do the professors who teach environmental courses come from an environmental department, other departments within the college, or from outside the college?
8. Is there a required introductory course for the major or minor?
9. Which programs best address the “breadth vs. depth” issue?

**Results:**

Table 1 summarizes basic information about the six colleges considered here. The program at Middlebury was the first undergraduate environmental program to be established in the United States, according to its website. Although Barnard’s longest-
running major dates to 1984, it was preceded by a program in Environmental Conservation and Management that began in 1949. The newest of the programs listed here is the Barnard College major in Environmental Policy, which was implemented as a response to many students designing their own major to focus on policy issues in the environmental field (personal communication, Catherine Cook, 5/2/06).

**Table 1**: Comparison of six colleges: total number of undergraduates, year environmental program began, and average number of graduates per year in the program.

<table>
<thead>
<tr>
<th>College</th>
<th>Total number of undergrads</th>
<th>Year program began*</th>
<th>Annual average number of graduates in program*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smith College</td>
<td>2700</td>
<td>1996</td>
<td>9 (minor)</td>
</tr>
<tr>
<td>Bryn Mawr College</td>
<td>1300</td>
<td>1993</td>
<td>4-10 (concentration)</td>
</tr>
<tr>
<td>Wellesley College</td>
<td>2300</td>
<td>2001</td>
<td>9 (major)</td>
</tr>
<tr>
<td>Barnard College</td>
<td>2300</td>
<td>1984 (Env. Science) 1997(Env. Biology) 2002 (Env. Policy)</td>
<td>15-20 total (major)</td>
</tr>
<tr>
<td>Mt. Holyoke College</td>
<td>2100</td>
<td>~1990</td>
<td>10-15 (major)</td>
</tr>
<tr>
<td>Middlebury College</td>
<td>2350</td>
<td>1965</td>
<td>45 (major)</td>
</tr>
</tbody>
</table>

* data collected via email correspondence

The annual number of graduates in each program varies from year to year and the figures given in Table 1 are only estimates. The number of graduates at Middlebury College, for example, ranges from 30 in 2006 to an estimated 57 in 2007. Other colleges show a similar fluctuation.

Three of the four colleges with majors (Wellesley, Mt. Holyoke, Middlebury) offer an environmental *studies* major, while the fourth, Barnard, offers three separate majors: Science, Policy, and Biology (see Table 2). Each college that offers one major
requires a specific concentration. Smith College is the only program (major or minor) that does not offer an introductory course.

Table 2: Six college comparison: Major, minor, concentration, and introductory course.

<table>
<thead>
<tr>
<th>College</th>
<th>Major</th>
<th>Minor</th>
<th>Concentration/focus</th>
<th>Introductory course</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smith College</td>
<td>No</td>
<td>Environmental Science and Policy</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Bryn Mawr College</td>
<td>No</td>
<td>No (concentration only)</td>
<td>1. Anthropology 2. Biology 3. Geology 4. Urban studies</td>
<td>Yes</td>
</tr>
<tr>
<td>Barnard College</td>
<td>1. Environmental Biology 2. Environmental Policy 3. Environmental Science</td>
<td>Environmental Science only</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Mt. Holyoke College</td>
<td>Environmental Studies</td>
<td>Environmental Studies</td>
<td>1. Disciplinary 2. Regional 3. Topical</td>
<td>Yes</td>
</tr>
<tr>
<td>Middlebury College</td>
<td>Environmental Studies</td>
<td>Environmental Studies</td>
<td>13 choices</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Table 3: Comparison of minors for four colleges: number and type of required courses.

<table>
<thead>
<tr>
<th>College</th>
<th># of required courses</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smith</td>
<td>6</td>
<td>1 chemistry, 1 geology, 1 ecology, 1 policy, 1 elective, 1 seminar</td>
</tr>
<tr>
<td>Mt. Holyoke</td>
<td>5</td>
<td>1 intro course 2 intermediate natural sciences 2 intermediate social sciences</td>
</tr>
<tr>
<td>Barnard</td>
<td>5</td>
<td>2 sciences w/ lab 3 approved electives</td>
</tr>
<tr>
<td>Middlebury</td>
<td>5</td>
<td>1 Natural Science and the Environment 1 Conservation and Environmental Policy 1 Nature’s Meanings 1 social science/humanities 1 natural science</td>
</tr>
</tbody>
</table>
**Environmental Minors:** The requirements for a minor vary among the five colleges that offer one. Information on four of these colleges (Smith, Mt. Holyoke, Barnard, and Middlebury) is found in Table 3.

Bryn Mawr does not offer a minor; the environmental science concentration is embedded within a major. Four core courses are required: Introduction to Anthropology, Earth Systems and the Environment, Ecology, and a senior seminar. In addition, the student takes a series of 10-11 courses in one of the following departments: anthropology, biology, geology, or urban studies. These courses are agreed upon with an advisor and generally have an environmental focus within that discipline. Individually designed concentrations in other disciplines are also possible; chemistry, economics, English, and political science departments offer this possibility. The total number of courses for both the major and the concentration is approximately 15.

**Environmental Majors:**

The number of required courses for an environmental major ranges from 11 for Wellesley to 15 for Middlebury (see Table 4). All of the programs that offer majors in environmental science/studies require at least one quantitative course. This may be statistics or data analysis; usually GIS courses fulfill this requirement also. Two of the majors at Barnard require two quantitative courses. All of the programs also require at least one introductory environmental course. Barnard offers several: two basic introductory courses that focus on general environmental issues centering on the atmosphere, ecology, geology, waste disposal, and urban concerns; and a more specific three course series, Earth’s Environmental Systems, which consists of three separate courses: Climate, Solid Earth, and Life Systems.
<table>
<thead>
<tr>
<th>College/Major</th>
<th>Requirements</th>
</tr>
</thead>
</table>
| **Mt. Holyoke:** Environmental Studies | Intro to Environmental Studies  
Statistics or data analysis  
1 other intro course  
2 intermediate level science  
3 intermediate level social sciences/humanities  
3 upper level courses in concentration  
1 additional intermediate/upper level course outside concentration  
Senior seminar |
| Total: 13 courses | |
| **Wellesley:** Environmental Studies | 1. Humans and Nature (intro course)  
2. 5 courses in area of concentration  
3. 4 electives to complement concentration  
4. Senior seminar |
| Total: 11 courses | |
| **Barnard:** Environmental Biology | 2 intro biology w/lab  
1 ecology  
1 organismal biology  
1 biology elective  
2 intro environmental science w/lab  
1 environmental methodology  
1 environmental science elective  
2 chemistry w/lab (1 must be organic)  
1 statistics/data analysis  
Senior seminar/thesis (2 semesters) |
| Total: 14 courses | |
| **Barnard:** Environmental Policy | 5 natural/environmental science (3 w/lab)  
2 quantitative assessment (data analysis, GIS)  
3 decision making foundation (economics, politics, etc)  
1 upper level social science  
1 junior research project  
Senior thesis (2 semesters) |
| Total: 14 courses | |
| **Barnard:** Environmental Science | 2 environmental science w/ lab  
1 chemistry w/lab  
1 ecology/biodiversity w/lab  
2 science electives  
2 quantitative  
4 approved electives  
Senior thesis (2 semesters) |
| Total: 14 courses | |
| **Middlebury:** Environmental Studies | Natural Science and the Environment (w/lab)  
Ecology (w/ lab)  
Conservation and Environmental Policy  
Nature’s Meanings  
Geographic Information Systems (GIS)  
6-8 courses in focus area  
2 cognate courses (choice from approved list – outside focus area)  
Senior Seminar |
| Total: 14-15 courses | |
Although each program combines natural sciences with social sciences/humanities, the proportions of these two areas vary considerably. Wellesley has the least number of required science courses in its Environmental Policy and Economics and Environmental Justice and Philosophy concentrations. Barnard, on the other hand, requires several science courses in each of its majors. Mt. Holyoke and Middlebury appear to have a balance between the two areas.

The program at Middlebury provides a broad foundation in the five courses that comprise its core requirements. It also provides for study in a particular area. There are thirteen possible focus areas: architecture and the environment; conservation biology; creative arts; environmental chemistry; environmental economics; environmental history; environmental geology; environmental non-fiction; environmental policy; geography; human ecology; literature; and religion, philosophy, and the environment. All of the concentrations require a minimum of four lab or field science courses, providing a solid science foundation.

Discussion:

By comparing the six colleges in terms of an environmental program, it is clear that there are many successful ways of incorporating an environmental education into a liberal arts program.

Minors/Concentrations:

Among the minors offered by Mt. Holyoke, Barnard, Middlebury, and Smith colleges, Smith has the strongest overall program in terms of number of courses required and their distribution (see Table 2). It does not, however, have an introductory course, which is required for both the Mt. Holyoke and Middlebury majors. Although an
introductory environmental course is not specified for Barnard’s minor, it is available and strongly recommended.

Although Bryn Mawr offers a concentration in environmental studies within a specified major, not a minor, it has clearly managed to achieve both breadth and depth. Introductory core requirements give a solid foundation and provide a perspective for subsequent courses. Providing additional choices for the combination major and concentration in a total of 8 subject areas (the set curriculum of anthropology, geology, biology, and urban studies, plus the individually designed curriculum in the chemistry, economics, English, and political science departments) makes the environmental concentration appealing to a greater number of students. Although the total number of courses for the minor is high (15), many of these courses overlap with the requirements for the major; only a total of four extra courses is needed to complete the concentration, making this relatively easy to achieve. In addition, depending on the courses chosen it may reflect a better environmental education than the typical minor simply because of the inter-relatedness to the student’s major field of study.

**Majors:**

Mt. Holyoke and Wellesley colleges both offer environmental studies majors, indicating programs that are not necessarily centered on science courses. This is particularly evident in Wellesley’s interdepartmental major with the concentration choices of Environmental Science, Environmental Policy and Economics, and Environmental Justice and Philosophy (see Table 3). The electives chosen with the help of an adviser to fulfill requirements for each of these concentrations are meant to “enhance understanding of how political processes, economic considerations, and ethical
choices compose or constrain understanding and action on environmental issues.”
(http://www.wellesley.edu/EnvironmentalStudies/envisci_reqs2.html). The five required
courses in the environmental science concentration are chosen from a list of biology,
chemistry, and geology courses. By combining these courses with electives from
government, economics, ethics, and other social sciences and humanities, a fairly broad
major can be constructed, although it seems to lack depth. The environmental policy and
economics concentration requires the five concentration courses to be from anthropology,
political science, and economics. The electives for this option are based on the same
advice given above, which results in a major that is more deep than broad because it lacks
any science except what is found in the introductory course and the seminar. The
Environment Justice and Philosophy concentration follows a similar pattern, resulting in
very little science and more depth in the humanities/social sciences areas. Required and
elective courses for this major include courses in religion, economics, political science,
anthropology, philosophy, and sociology.

Mt. Holyoke’s environmental major has more balance between the natural and
social sciences (see Table 3) and seems to successfully solve the depth vs. breadth
problem as far as is possible with a total of 12 courses. Not only does it require a certain
number of natural science courses and social science courses, it also requires a
quantitative analysis course. The approved course listings for the intermediate level of
science and social science requirements are limited, allowing students some degree of
choice while ensuring that particular subjects are covered. This kind of specificity does
not seem to exist in the Wellesley program where students may choose from an extensive
list for courses in their concentration as well as courses that complement their concentration (the influence of an adviser could certainly affect the actual choices).

Barnard College makes a statement about the importance of an environmental curriculum by the fact that it offers three distinct majors (Table 4). What is unusual about these majors is the amount of hands-on courses that are built into the program. Many required courses have labs, some electives include several field trips, and methods courses are available and often required (environmental field methods, environmental measurements, and hydrology). Barnard offers a wide range of environmental courses that includes courses on specific topics not seen at the other colleges. Some examples are Industrial Ecology, Alternative Energy Resources, Anthropology of Consumption, Ecotoxicology, Forests and Environmental Change, and International Relations to the Environment.

All of the women’s colleges considered here are affiliated in some way with other institutions. Barnard is closely associated with Columbia University and many of its environmental courses are taught by Columbia University faculty. Although Wellesley’s major is interdepartmental by definition and draws its faculty from several departments, it also draws from MIT’s urban planning and engineering departments. Bryn Mawr shares resources with Swarthmore College, Haverford College, and the University of Pennsylvania. Smith and Mt. Holyoke belong to the Five College Interchange, which also includes Amherst College, Hampshire College, and the University of Massachusetts, Amherst. UMass is particularly of interest for Smith because of its size and its offerings of three separate environment-related majors.
The environmental studies major at Middlebury College is interdisciplinary and non-departmental. Its program is probably the most successful of the six colleges considered here in solving the breadth vs. depth problem. Not only is it the oldest program, it is also the largest, with an average of 45 students graduating with the major each year. Its choice of focus groups is broad and includes areas not found at the other colleges such as human ecology, environmental non-fiction, environmental history, creative arts, literature, and architecture and the environment. Middlebury has an international option that is not seen in the other colleges compared here; approximately 60% of the environmental majors study off campus for at least one semester at locations specifically chosen for environmental study, either abroad or in the United States. Middlebury has a recommended approach to the study of international environmental issues that includes language study, study abroad, and a cross-listing of courses that incorporate both environmental and international concerns.

Smith College:

Is developing an environmental major the right direction for the Environmental Science and Policy Program at Smith College? The goal of the program is to increase environmental awareness and literacy on campus, not necessarily built a large program (personal communication, Joanne McMullin, 3/31/2006). There is no doubt that the subject of the environment is a broad one. One possible option is to acknowledge this breadth by intentionally and liberally incorporating environmental elements throughout the arts, sciences, and humanities. This can be accomplished in several ways: adding courses across the curriculum that have an environmental component, cross-listing
existing courses, providing an introductory environmental course that is accessible to all students, and hiring new members of the faculty in other disciplines who have a solid background in environmental science/studies in addition to their chosen discipline.

In April 2006, Smith alumnae spoke at the college about their careers in the environmental field. When asked if they would have benefited by having an environmental major instead of the major they graduated with (these varied), the general response was that their liberal arts education seemed to serve them well, regardless of major. James Hornig (1996) argues in his article “Training the Next Generation” against using the job market as a measure of the success, failure, or necessity of a specifically environmental education. He states:

. . .we do not normally measure the success of a history or philosophy department by the number of graduates who become historians or philosophers. It would be well to remember that environmental studies may best be seen as an attractive centerpiece to a liberal arts education. The best measure of the success of such programs would be the number of physicians, lawyers, businessmen, or politicians who reflect the values and worldview of an interdisciplinary environmental studies program. (p. 30)

One alumna mentioned that when considering new employees, a key factor in hiring was their ability to write and communicate well. Hornig (1996) supports this observation when he refers to studies showing that both employers and employees in environmental fields view communication skills, both written and oral, to be the most critical for success (p.29).
The importance of a general liberal arts education that teaches students to write and think critically is obvious, but is this a reason for not having a major in a critical field of study? Depth is obviously an important component to a college education; this is, after all, the reason for the requirement of a major. In a world where environmental issues are increasingly important, it seems unreasonable not to offer a major in such a crucial area. The breadth of the subject itself does not preclude the establishment of a major; one needs only to look at the Women’s Studies and American Studies programs at Smith to see examples of broad interdisciplinary, interdepartmental majors. In fact, to not have a major is to expect students with passion and ability to “make do” with second-choice majors while their environmental education is acquired in a “trickle down” manner through other courses, or courses they select for the minor. This kind of indirect environmental literacy may be appropriate for the majority of students but for those with a passion and drive to tackle some of the most difficult problems we, as a species, have ever faced, the lack of a major seems indefensible. Surely Smith is losing good students who must look elsewhere for an environmental major.

Not only does the lack of a major result in a huge disservice to the students, it reflects poorly on Smith College. As a top liberal arts college, Smith is an academic leader in many areas. The 2005-06 Smith College catalog states: “. . . the college continues to respond to the new intellectual needs of today’s women – offering majors or interdepartmental programs in computer science, engineering, women’s studies, Third World development, neuroscience, film studies, Latin American studies, history of science and technology, and other emerging fields.” (emphasis added) (p.4). The
philosophy and attitude seems to be present, so one must ask, where is the environmental science and policy major?

It is essential that the faculty regard an environmental major as important enough to deserve the efforts involved in its creation. An interview with Smith College president Carol Christ (4/19/2006 with Marie Laure Couet) indicated that the decision to create a major lies primarily with the faculty, not the administration. The main concern voiced by members of the steering committee of the Environmental Science and Policy Program (most of whom are faculty) seems, not surprisingly, to center on the breadth vs. depth issue. As outlined in this paper, there are several ways this problem has been solved by other colleges. These examples demonstrate the flexibility that is possible when designing a major; there is no one “correct” way to accomplish this. Faculty who are uncertain about the usefulness of a major may find this flexibility encouraging. By discussing the range of possibilities, the steering committee may discover ways that Smith can design a major that specifically fits the goals and objectives of both faculty and students. With their considerable experience in the academic and scientific arenas, professors are uniquely qualified to craft a program that will serve both the students who desire intense study in environmental issues and Smith College as a whole.

The difficulty of developing an environmental major is not insurmountable. The issues surrounding a possible major are not unique to Smith College and have been addressed by other colleges in a number of ways. Hornig (1996) reports that “Experimentation at hundreds of institutions over the past 25 years has not led to a consensus about the content of an environmental education.” Rather than expressing
dismay at the complexities of the task, it may help to keep the broader picture in mind. David Orr (1994) sums up the importance of educating our future leaders:

Those now being educated will have to do what we, the present generation, have been unable or unwilling to do: stabilize world population; stabilize and then reduce the emission of greenhouse gases, which threaten to change the climate, perhaps disastrously; protect biological diversity; reverse the destruction of forests everywhere; and conserve soils. They must learn how to use energy and materials with great efficiency. They must learn how to utilize solar energy in all of its forms. They must rebuild the economy in order to eliminate waste and pollution. They must learn how to manage renewable resources for the long run. They must begin the great work of repairing, as much as possible, the damage done to the earth in the past 200 years of industrialization. And they must do all of this while they reduce worsening social and racial inequities. No generation has ever faced a more daunting agenda. (p26)

This is indeed a daunting agenda, but there are students everywhere who are eager to tackle it. Some of the brightest and most talented women in the world come to Smith for their education. Smith’s contribution to the future is to educate and inspire these women, giving them the essential skills to become leaders in whatever field they choose. Those students who choose the environmental field with passion and enthusiasm deserve to be met with an equal
enthusiasm on the part of the faculty, and an opportunity to undertake what could certainly be called the most important work of the twenty first century.

**Recommendations** (in no particular order):

1. **Establish an introductory environmental course.** This would serve as a foundation for future courses for either a major or a minor in environmental science and policy. It would also be an avenue for all students to become more environmentally literate. Students who are not comfortable with starting out a possible minor by taking science classes could “test the waters” first to see what the subject encompasses, and then decide if it is something they’d like to pursue further. For this reason, it should not be categorized as a First Year Seminar, which excludes a large part of the student body. An introductory course would also change the content/level of the senior seminar. By requiring an introductory course, the capstone seminar would have the freedom to explore specific issues in more depth, concentrate on important current issues, or emphasize guided research in the field.

2. **Poll the student body for views on an environmental major.** There is no point in creating a major without sufficient student interest. Polling students may have limited benefit, however, because the student population changes regularly. As shown in table 1, the number of students majoring in environmental studies or science fluctuates widely. This fluctuation of interest may be common in all majors and must be taken into account when evaluating student responses.
3. **Cross-list environmental courses.** This is crucial to incorporating environmental literacy into the general Smith curriculum. Cross-listing courses would draw attention to the broad nature of environmental study and emphasize the many disciplines affected by environmental concerns.

4. **Add an environmental component to the Latin Honors requirements.** Specific courses across the curriculum could be designated as “environmental” (much as math (M), literature (L), and art (A) and so forth are now) and added to the required areas of study for consideration of Latin Honors. Unprecedented world concerns such as global warming and energy sources clearly justify the importance of such a designation.

5. **Work with other colleges.** As noted above, the five women’s colleges considered here all have affiliations with other institutions. Obviously such connections are worthwhile and beneficial in many areas, and could provide resources (professors, courses, etc) necessary for a new major.

6. **Hire a new faculty member exclusively for the ES&P program.** This person would teach environmental courses (possibly an introductory course) but have a lighter than usual teaching load, allowing time to develop the major. By working with the director and program coordinator, this faculty member would take on the time-consuming aspects of developing courses and coordinating the faculty necessary to teach those courses.
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