

# Launching an Environmental Science Major: Experience at Northwestern

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In the January *GSA Today*, P. Feiss's thoughtful article "The Survival of Academic Geology Programs" discussed how academic geology programs might adapt to pressures by university administrators unsympathetic to the earth sciences. His article reflects a common topic of discussion among earth scientists. One often-discussed approach is an increased "environmental" (a term that can mean almost anything) component of the undergraduate curriculum.

Having led such an effort several years ago while serving as department chair, I am often asked by colleagues elsewhere about what we did, how well it worked, and whether I would recommend a similar effort at their institutions. In this spirit, I offer here a brief personal perspective on the approach taken in this department which may be of interest to others considering various options.

In early 1991, following a meeting of science department chairs in which we considered how to better attract science-oriented undergraduates to Northwestern, I suggested that an interdisciplinary environmental science major might attract good students whose interests crossed lines between the standard departmental majors. Professors John Walther and Donna Jurdy joined me in planning the program.

Initial discussions brought me to a realization that, I suspect, inhibits many such proposals. Clearly, our department would have to shoulder most of the considerable effort required to overcome the bureaucratic barriers in establishing a new major. On the other hand, although the major would benefit the university as a whole, it would offer little direct advantage to the geology department. The only immediate benefit would be increased enrollments in our environmentally relevant advanced undergraduate courses. From past experience, even a highly successful program seemed unlikely to improve our traditionally chilly relations with the administration.

Nonetheless, largely from a vague sense of "good university citizenship," we decided to plan the program. We realized that a faculty, rather than administration, proposal would face opposition, and new resources would not be available. We had to develop a viable major "on a shoestring." Our proposal thus had several key features, as follows.

1. *Building on an existing major.* The existing geology major provided an excel-

lent basis. It included a broad background in mathematics, physics, and chemistry. Moreover, many earth sciences courses are intrinsically "environmental" (an obvious fact that is, surprisingly, often unappreciated outside geology departments).

2. *Intellectual rigor.* We wanted the major to offer students adequate preparation for either graduate study in science and engineering, or professional school. We thus tried to provide as strong an intellectual base as possible, given the necessary tradeoff due to the ill-defined but broad scope of environmental science and the constraints on the number of courses required. Thus, relative to the geology major, environmental science basic requirements are less physics (two rather than three quarters), less mathematics (one rather than two years), and less introductory earth science (surface processes but not interior processes), but more chemistry (i.e., through organic chemistry) and some biology. Students also select three classes on explicitly environmental topics, and two social science courses from an approved list in economics, political science, or sociology.

3. *Accommodating students of various interests.* Beyond the basic courses, the major requires four advanced courses chosen from an approved list in biology, chemistry, geology, statistics, and civil engineering. Students can thus design a program that meets their own interests within the broad environmental area.

4. *Minimum impact on the geology department.* Given our small (then 13 full-time equivalent) faculty, we could not ask most colleagues to assume additional burdens. The program was thus based initially on existing courses. The primary additional responsibility would be on the program director. We recognized that the program would probably have more majors than our small geology major, and that new courses would be added later.

### 5. *Involvement of other departments.*

Although the major had to involve other departments, it would be unrealistic to expect new courses, at least initially. We thus sought advice on suitable courses in other departments from sympathetic colleagues, especially from geography, biology, environmental engineering, and chemistry. We proposed that once the program began, it would be administered as an interdepartmental major by a committee of faculty from various departments who would modify the initial program as needed.

In summer 1991, we made a formal proposal for the major. The proposal faced opposition that favored "dumbing down," on the theory that reducing basic science requirements would attract more students. After heated discussion, the department prevailed and the proposed major was instituted in fall 1992. It was promptly successful, in large part due to John Walther's able directorship during the crucial first two years. Following Walther's move to Southern Methodist University, directorship of the program, by then established, passed to geography professor John Hudson (who had assisted us in the planning) and then to geology professor Robert Speed.

Earth scientists at other institutions often ask several questions about our experience.

*Is the program working?* I would say "yes." The program has a healthy and growing major population, currently about 50 students. Although there are problems, including the fact that some biologically oriented students have trouble with some advanced geology courses, faculty members teaching in the program seem pleased.

*Was organizing the program worth the effort?* I would say "maybe." The program achieved increased enrollment in upper division courses, but it has not perceptibly improved our standing in the university. For example, the department was not permitted to hire two distinguished environmental scientists whom we hoped would greatly strengthen our research effort. There may, of course, be intangible or long-term benefits which are not yet apparent.

*Does the program's future look good?* My sense is "yes." Enrollment is growing, new

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courses are being added by various departments, and consideration is being given to expanding the program by providing explicit "tracks" for students of differing interests. Although the founding faculty from this department are no longer involved, others both from geology and other departments have become involved.

If you think your geology departments might try such a program, keep in mind that the size and scope depend both on the department size and internal

resources and on the resources available elsewhere on campus and nearby. The expected return depends on the department's relation with the administration. Our experience suggests that programs like ours will successfully attract majors and increase enrollments in some upper division courses. Whether other significant benefits should be expected is hard to predict. There is also some risk that the success of an environmental major might encourage an administration to view the

geology department largely in terms of its teaching role in the program, rather than viewing the program as one component of a broad research and teaching mission. Departments considering environmental teaching initiatives may thus wish to weigh the required effort and the anticipated returns. As in all matters educational, no single model will apply to diverse institutions. ■

