**Environmental Science B.S. degree program at UNM**

The B.S. degree in Environmental Science (ENVS) at the University of New Mexico was conceived in the late 1990s by the Department of Earth & Planetary Sciences (EPS, formerly Geology) to fill a perceived gap in programmatic offerings at UNM. Several emerging subfields of the Earth sciences such as hydrology and atmospheric sciences had no clear academic home at UNM, but EPS had bolstered its own capabilities in these areas in the 1990s. The department devised a new B.S. degree program designed to emphasize a physical systems approach to environmental studies. We sought to cover non-petrological aspects of Earth science in more depth and breadth than the existing undergraduate geology degree program allowed. We thereby hoped to attract a complementary, and perhaps more diverse, group of students into an Earth science major within the EPS department while keeping the existing geology-focused major (which carries the EPS departmental name).

When ENVS was developed we faced several administrative challenges that strongly affected the structure of the program. Interdepartmental majors are very difficult to implement at UNM, and an environmental science major within EPS would necessarily have a very strong emphasis on physical processes. The ENVS program treats biogeophysical systems only superficially and has a smaller component of environmental policy analysis than many other degree programs elsewhere with an "environmental" label. We hoped to address ecological issues by including several upper division courses from the Biology Department as an Ecology Group within the ENVS major. Environmental history and policy studies were not included explicitly in the ENVS curriculum, but interested students were encouraged to take such coursework as part of a minor course of study. (All students in the UNM College of Arts & Sciences must satisfy requirements for both a Major and a Minor concentration.)

ENVS was developed at a time of tight budgets within the university so our department requested no additional resources for the new major, and no departmental resources were diverted internally from the existing EPS major. The absence of new support necessitated designing the ENVS curriculum around existing courses -- just two new courses were developed for the program. The ENVS major has three required upper division core courses: a new gateway course in Environmental Studies, a new capstone course involving group work and field measurement methods, and a course on statistics/data analysis that already existed within the EPS department. Other pertinent upper division courses were organized into a menu of seven Groups: Spatial Analysis (mostly GIS), Geoscience, Geochemistry, Climate, Hydrology, Surface Processes, and Ecology. Students choose four Groups and take two courses from a list of allowable courses in each Group.

After more than a decade of experience with the ENVS major, its core strengths and weaknesses have become clear. Our goal of attracting a larger and more diverse student population has been achieved. The introductory level course offering, Environmental Science 101 ("The Blue Planet") satisfies the college's core curriculum requirement for physical science and is now the most popular such course on campus. In terms of both absolute numbers and diversity of undergraduate majors, ENVS is an unqualified success, attracting a larger number of Hispanic and Native American students than the traditional EPS geology major -- an important accomplishment given UNM's status as a Hispanic-serving institution, with a large Native American student body. The programmatic flexibility built into the ENVS degree program is appreciated by many ENVS majors. The EPS major still thrives, alleviating concerns expressed by some department faculty members when ENVS was implemented.

Our experience with ENVS has identified several severe challenges, some of them predictable and others perhaps less so. The department is now actively considering how to address them. Predictably, by not obtaining new resources to support ENVS at the time of its establishment we now must swallow the fruits of student credit hour success: ENVS enrollments have placed an extreme strain on static instructional resources. ENVS 101 lecture and laboratory sections routinely fill up. Our graduate student TAs face a higher instructional burden to cover ENVS intro labs, we have inadequate laboratory space, and we turn students away from oversubscribed sections. At the upper division level, the absence of a better-defined spine of required courses leaves the curriculum less cohesive than we would like, inhibiting assessment of programmatic outcomes. Compared to our EPS majors it has been harder to develop a strong esprit de corps among ENVS majors who have less opportunity to share mutual experiences in a common track of classes. The mix of ENVS and EPS majors in our upper division courses is difficult for instructors, especially in courses that were originally designed for students who are in the midst of the geology core curriculum.

A few administrative challenges have been more difficult than we anticipated. We rely on some other departments (especially Biology and Geography) for considerable coursework in the ENVS Ecology and Spatial Analysis Groups. Curricular changes in those departments therefore affect ENVS majors. Several years after ENVS was implemented the Biology Department completely changed its introductory lower division core sequence in a way that would require ENVS majors to take three additional semesters of lower division Biology coursework in order to satisfy prerequisites for our required upper division Ecology courses. The extra coursework greatly inhibits the ability of our students to major in ENVS and still take upper division Biology classes. More generally, the extensive menu of possible ENVS coursework, including some courses that are offered rather infrequently, makes advisement difficult, leads to student frustration that one or two courses needed to graduate are not offered in timely fashion, and frequently renders our published degree requirements out of date when new upper division courses are developed, or courses are renumbered or no longer offered.

Student preparation for quantitative coursework is a large concern for faculty, with regard to all of our departmental majors. Two semesters of calculus, and calculus-based physics and chemistry, are required for both ENVS and EPS B.S. majors. These supporting sciences pose a huge -- for some insurmountable -- obstacle for many of our majors, especially for the broader diversity of students in ENVS. Many students who enter ENVS after getting hooked by ENVS 101, without having previously considered pursuing a degree and career in science, find themselves ill-prepared for calculus-level math courses. The introductory calculus and physics courses at UNM have very high failure rates. Many students eventually choose to complete these courses at a local community college. Too many of our majors go out of their way to avoid the more quantitative course offerings within the seven ENVS disciplinary groups, and only get through their introductory "supporting science" course requirements as their final hurdle before graduating.

Our ENVS graduates follow many of the same career pathways as EPS majors, including graduate school. A considerable fraction of ENVS majors enter water-related careers, for which the ENVS curriculum is well-suited. Assessment of water resources (in terms of quantity and quality) is a huge concern in New Mexico, a semi-arid state where water availability and quality are ubiquitous limiting factors for businesses, people and ecosytems.