

**CALIFORNIA STATE UNIVERSITY, EAST BAY**

**DESIGNATION CODE: 05-06 CAPR 24**

**DATE SUBMITTED: June 1, 2006**

**TO:** The Academic Senate  
**FROM:** The Committee on Academic Planning and Resources  
**SUBJECT:** Five-Year Program Review for the Environmental Sciences Program  
**PURPOSE:** Approval by the Academic Senate

**ACTION**

**REQUESTED:** Acceptance of the Five-Year Program Review of Environmental Sciences and approval of the continuation of the program without modification

**1. BACKGROUND INFORMATION:**

**• Overview description of the program**

The Environmental Science program is an interdisciplinary major overseen by four faculty members on the Environmental Science Program Committee as an overload; each member has a full-time tenured appointment in a program that offers courses in the ENSC major. In Fall Quarter 2004, the quarter with the most recent statistics, the program had 23 majors, a number that was fairly stable over the past five years. The program offers a single degree: Environmental Science B.S. with four options: Biology, Chemistry, Environmental Systems and Resource Management, and Geology.

The ENSC major is a unique undergraduate program because it has no program status or budget, is sustained by faculty from four programs in two colleges, and offers its own courses (ENSC) exclusively on an overload basis.

**• Overview of the documents submitted to CAPR**

The following documents were submitted by the Environmental Science program for the five year review: Environmental Science program five year self-study and plan; (including attachments: Mission and objectives, and student learning outcomes statements; plans for changes in core curriculum and options; and plans to assess student learning); Report of the Environmental Science program external reviewer; and Reply to the outside reviewer for Environmental Science. In addition, because this is the first five year review for the program, comparisons to other CSU and UC Environmental Science programs and to major options in the participating programs were included in the study.

**2. FIVE-YEAR PROGRAM REVIEW/SELF-STUDY**

**• Summary of specific areas of the Self-Study**

The Environmental Science Program is to be commended for the thoroughness of the material presented to the Committee on Academic Program Review for the five-year review. The program clearly characterized its recent and current status with respect to leadership and faculty, student enrollment, and [absence of] administrative support. The study identified five proposals for material support ENSC views as essential to allow the program to sustain its major develop new community and campus connections. The outside review concurred with the program's self study and proposals.

The documents submitted for the five year review of the Environmental Science Program did not include the program elements outlined in the *Suggested Student Learning Outcomes Assessment Plan Rubric* from the *Academic Review Outcome Team Recommended Assessment Plan Rubric*

(December, 2003) which CAPR has asked programs to use this year. This omission highlights the institutional difficulties of trying to offer a program when the Program Director is NOT included in either of the participating College's program chair structure: information routinely distributed to Program Chairs is not shared with the Program Director.

#### Section IV – Program Data

Indicators of the program's success are the steady number of majors, and a steady increase in graduates. (It should be noted, however, that the major is not currently listed on CSUEB's University Institutional Research and Analysis web page for "Degrees Conferred".)

*SFR and FTE/FTES:* ENSC has only two courses with the program's hegis code: 2800: Environmental Problems of California, currently a GE and not a major course, and 4800: Senior Seminar, the major capstone. All other courses in the major are current offerings from the four participating departments: Biology, Chemistry, Geography and Environmental Studies, and Geology. Calculations of SFR and FTES are impossible in these circumstances.

#### Comparison to Other C.S.U. and U.C. Environmental Science Programs

The program compared itself to Environmental Science Programs at Bakersfield, Channel Islands, Chico, Fresno, Humboldt, Monterey Bay, Long Beach, San Diego, and San Luis Obispo, UC Berkeley, UC Davis, and UC Riverside. CSUEB's Environmental Science Program compared favorably to each of these in number of courses in each area of concentration and offers more breadth than most of the other campuses. It also led the Program Committee to propose modifications in the curriculum (see below).

#### Program Achievements

The program's achievements in its first five years focus first on developing both an interdisciplinary capstone course that is team-taught and the creation of an introductory general education course to attract students to the major. In addition individual faculty have distinguished themselves and in turn the program. They each remain active in both their home disciplines and Environmental Science, they are each very active in teaching, research, and outreach for both their home departments and ENSC. The four faculty who comprise ENSC participate actively in college and university governance. Their continued publishing and conference achievements are significant and bring welcome notice to their home departments, to ENSC, their Colleges and CSUEB.

#### Summary

The program presents itself as sustaining a new major of high quality with a strong selection of areas of concentration for its majors, and a faculty who are willing to teach ENSC as an overload while continuing to be active participants in their home departments and in university governance. The Program Committee notes that its lack of institutionalized place, much less an official presence in each participating College's program governance structure, makes it difficult to meet the promise of enrollment growth during a time when the study of Environmental Science should be in high student demand.

#### **Summary of supporting data**

Several documents reporting data were appended to the self-study: Academic Performance Review Statistics for 1998 - 2004; Degrees Conferred by the Program; Headcount Enrollment for Environmental Science; and Degrees Conferred for Environmental Science. These documents show the Program's first baseline:

##### Performance Review Statistics

1. a steady number of undergraduate majors ranging between 25 and 30 for the first five years
2. relatively stable SFR (it is impossible to calculate most FTE/FTES figures since most courses in the major are major courses for other departments)

3. moderate diversity of student population

Degrees Conferred

4. an steady but slight increase in undergraduate degrees awarded in the first five years

### **3. OUTSIDE REVIEWER'S COMMENTS & THE PROGRAM'S RESPONSE**

The program review visitation took place on April 27, 2005. The reviewer, Dr. Stephen Welter, Professor of Environmental Science, Policy, and Management, University of California, Berkeley, met with the four Environmental Science Program faculty, the Program Director, undergraduate students, and the Dean of the College of Science.

#### Summary of Dr. Welter's comments

*Administrative Structure.* The ENSC program is an admirable creation of a cross-disciplinary, cross-college program by faculty who exhibit significant energy and commitment to make the program real. The program and students benefit from the cross-disciplinary and expert faculty who encourage students to take advantage of the interests and expertise found in the individual faculty member's home department. HOWEVER, lack of departmental structure, or affiliation with a single department appears to present challenges to the program's success.

Communication with upper administration is informal and intermittent leaving ENSC out of the loop on some important issues. Suggest that the Program Director be included on all Department Chair lists and be included in College Chair committees to minimize the problem. Lacks administrative support; lacks assigned time for the Program Director. Dependence on the good will of the faculty, and particularly the Program Director endangers the long-term viability of the program.

*Program size.* As the struggles of small departments in the Colleges of Science and Letters, Arts, and Social Sciences indicate, Environmental Science needs to increase the number of majors from its stable base of 25-30. The growth that seems very likely with more visibility and more time from the faculty is unlikely given current administrative structure, lack of budget and four volunteer faculty.

*Faculty.* The current faculty are clearly devoted and give as much of their time and energy to the ENSC program as their commitments to their home departments and majors allow. That this program is not funded but managed on volunteer time of the faculty is a significant problem for any long-term planning. The faculty will eventually "burn out" as they continue to shoulder the demands of sustaining a program over time. More faculty need to be involved in the ENSC program to assure its viability into the future.

*Curriculum.* Dr. Welter commended the program for a "major [that] is rich with a wide variety of options and requirements which should result in students very well trained for future careers in the fields of environmental science or for future educational pursuits." He suggested that the faculty consider reducing the number of core courses and increasing the number of electives in the option areas; that the faculty explore the possible integration of the Environmental Studies and Environmental Science majors; that the faculty examine the curriculum taking the view of an independent major. He suggests that some required courses may be more value to the home department to shore up enrollments in particular courses or options. If ENSC becomes such a vehicle for the four departments, the major risks losing its current integrity.

*Students.* Dr. Welter reported that his interviews with students showed that the students believed they were receiving a superior education with close contact between students and faculty. He cautioned that any program growth should not sacrifice the sense of "intimacy and ownership" the students expressed. While the students had no complaints, they did express a desire for more field

and laboratory courses to give them hands-on experience and application of their learning. One student expressed concern about the limited availability of some courses each year.

*Recommendations:* In conclusion, Dr. Welter found the Environmental Science program's strengths to be its cross-disciplinary nature, the passion of the students for the major, and the energy and commitment of the faculty. His 11 recommendations focused on Administrative Structure and Curriculum particularly recommending: moving the program to one that operates within the normal channels of departmental structure in the University providing budgetary and administrative support for the faculty and release time for the Program Director; review of the curriculum to create a more streamlined set of courses and redistributing the required components from the core to the options, and an increase in the field and lab opportunities for students to have more hands-on experiences.

#### **Administrative**

1. Inclusion of ES program chair in communication channels or meetings for department chairs
2. Consider more formal recognition of the program director's role with release time
3. Create a timeline with targeted changes and goals, with buy in from the program faculty, the associated departments, and the higher administration. Criteria for assessing program success should be appended to the timeline.
4. Increase the number of faculty directly involved with the administration of the program as well as the teaching.
5. Enhance the presence of the major on CSUEB websites.
6. Determine the desired target size of the program and plan accordingly for resource and faculty demands.

#### **Curriculum Development**

1. Review the major relative to the core and elective courses to develop a comprehensive, but streamlined, set of courses independent of the four departmental affiliations
2. Consider reducing the number of required courses in the core to increase the number of students declaring the ES major. Consider reductions in requirements from outside the home departments (physics, e.g.) as well as those within the home departments (the GIS course, e.g.)
3. Review the overlap between ENSC and Environmental Studies to determine if a single major with multiple tracks can be developed
4. Heed the students plea for continued, if not increased, "hands-on" lab courses that include field experiences where appropriate.
5. Consider developing closer ties to outside constituencies: internship opportunities, employment, educational or funding opportunities.

#### **Response of the Program**

The program faculty acknowledged Dr. Welter's comments and agreed with most of his conclusions and with most of his recommendations. The program faculty generally agree that more faculty in the program could assist the workload the current faculty experience but such a change would require a new administrative structure. They also agree with Dr. Welter's conclusion that there is a need to streamline the major requirements but the faculty are not in full agreement about the specific recommendations for reduction and re-distribution he outlined. The program faculty are placing great hope in adding an introductory course to satisfy some of the curricular challenges. While the faculty are pleased that students want more laboratory and field courses, they note that their ability to affect courses in other departments is limited and they are currently satisfied with the number of lab courses in the major. Dr. Welter's recommendation for stronger ties to outside constituencies is welcomed and the program has begun to do just that. The faculty, working on

ENSC as an overload, simply lack the time to do as much as they wish. Assigned time for the Program Director would assist greatly in forwarding this effort.

#### **4. PROGRAM'S FIVE-YEAR STRATEGIC PLAN (2005 - 2009)**

##### Curriculum

ENSC faculty have committed themselves to significant changes in curriculum, along the lines recommended by the reviewer, including adding to the core Biology 1401, a new Geology GIS course, ENSC 2800, and Math 1305, while removing Chemistry 2301 and 2302 and Econ 2301. The Chemistry courses would be included in the Chemistry option instead of the core.

##### Students

The program faculty plan to increase its number of majors over the next five years, by connecting with local community colleges to increase the number of ENSC transfer students, and by increasing connections with ENSC teachers and students in those community colleges. The faculty see a clear increase in employment opportunities in the Bay Area and statewide and plan to leverage that to increase the number of majors.

##### Faculty

The program's five-year plan is not clear. The biggest threat is faculty burnout but the ability to bring in more faculty is fraught with problems both within the Program Committee and given the lack of institutional structure.

##### Resources

Clearly, the greatest need for ENSC is to receive the kind of administrative support other departments with fewer majors have by virtue of departmental status. The 5 year plan specifically describes needed development and the resources required to achieve those developments.

#### **5. CAPR ANALYSIS OF THE PROGRAM'S FIVE-YEAR REVIEW**

##### Program

The Environmental Science Program conducted a thorough and balanced self-review. The data and documentation included in the review package clearly supported the claims and conclusions of the program and outside reviewer. The curriculum appears to be sound, with a clear need for modifications in the future. The number of majors is steady and, if the program faculty are able to complete their plans, should grow in the future. The program has written a mission statement, identified program objective and student-learning outcomes. The faculty have collected artifacts to assess whether the students are achieving the outcomes but as yet lacks any direct measure of educational effectiveness.

The Environmental Science program is currently in the midst of discussions about its future administrative structure involving each of the faculty on the Program Committee, chairs and interested members of home departments, and the Deans of both colleges involved in the program. While this is a necessary direction, CAPR expresses its strong view that any resolution to the ambiguous state of the program not sacrifice the unique cross-disciplinary nature of the program, especially building in structures to facilitate cross-College participation and voice in the program's future.

Class sizes in the program are difficult to assess since most of the courses are required course in other majors. Of serious concern is the impact of the elimination of the second year clusters on the [newly proposed] entry course for the major: ENSC 2800. When ENSC was a part of a science cluster, the course averaged enrollments of 67 students each spring quarter. This spring, the first offering since the elimination of second year clusters, 18 students enrolled in the course. Since the department is looking at 2800 to recruit new majors, the need to increase its enrollment is real.

CAPR recommends that the faculty consider proposing an environmentally themed freshman year cluster when the call for new clusters is circulated in the fall.

The program indicated that it has current collaborations with other programs and has plans for future collaboration. CAPR recommends that the program continue to forge alliances with both internal and external programs and agencies to increase enrollment and provide student internship and funding opportunities in future.

### Assessment

CAPR commends the Environmental Science Program for the assessment plan it has in place and urges that

- 1) Analysis of the artifacts already collected be completed as soon as possible and included in the annual report required next year.
- 2) Given the faculty overload already in place, the planned intensive assessment should be supplemented by equally careful plans to survey program alumni (as a critical mass is graduated) to provide hands-on feedback about program preparation, help keep the program as current as possible, and provide for long-term evaluation of curricular decisions and program effectiveness.
- 3) Examine the direct and survey measures of student learning to guide future curricular decision and to support potential instructional changes.
- 4) Collect entry-level data in ENSC 2800, even before the course is officially made the entry course for the major. Problem-based learning artifacts in ENSC 2800 that model the assignments in ENSC 4800 (already archived) should be collected and analyzed to provide the program with authentic assessment of students' improved acquisition of program goals over time.

### Resources

1. There is no question that ENSC requires administrative support in several dimensions: a base budget for outreach and recruiting activities, and to advertise its courses. Release time for the Program Director to do the daily work of any major program on campus. The ENSC program cannot be sustained with the overload and uncompensated labor of four very dedicated faculty. The plans for (but lack of) a web presence for ENSC is just a minor indicator of the over-extension of the faculty in the program.

2. The need for institutional "regularizing" and creation of an administrative structure for the program must not come at the expense of an Environmental Science program unique in all of Northern California. The outside reviewer commented regularly on the importance and richness of the program in crossing not just boundaries in the sciences but also between the sciences and social sciences. Were the program to be subsumed in a department in the College of Science, the independence of the program would be significantly jeopardized and the links with the College of Letters, Arts, and Social Sciences would be significantly weakened. CAPR urges that alternative models along the lines of the graduate multi media program be examined as a possible way to sustain the characteristics of the current program.

## **6. CAPR RECOMMENDATION FOR CONTINUATION OF THE PROGRAM**

CAPR recommends the continuation of the BS program in Environmental Science without modification.

**DATE OF THE PROGRAM'S NEXT FIVE-YEAR REVIEW: 2009/10**