Department of Environmental Studies

California State University, Sacramento

Self-Study - Fall 2016

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Section I. General Program information

A. Background

The Department of Environmental Studies (ENVS) at the California State University, Sacramento (hereafter CSUS or Sac State), is one of 10 Departments in the College of Social Sciences and Interdisciplinary Studies. The Environmental Studies program at CSUS arose out of a sense of environmental crisis associated with signs of deterioration of the natural environment. Rachel Carson's *Silent Spring***,** published in 1962, created concern about the wide-spread and poorly regulated use of persistent pesticides and industrial toxicants. American cities experienced intense air pollution that was highly visible and obviously unhealthy. Water pollution was symbolized by the day that the Cuyahoga River in Ohio caught fire. There were also serious concerns about the fate of the global environment as human population growth rates soared. Neither laws nor public policy appeared capable of addressing the issue of environmental degradation.

Scholars found that academic disciplines had become so specialized that it was difficult to conceptualize and study environmental problems, which required insight and expertise from myriad disciplines. This also made it difficult to teach about the problems. There was no curriculum that provided students with an understanding of general environmental degradation or specific environmental problems. In response, a group of faculty at CSUS created an interdisciplinary program drawing on existing courses in several fields. Concurrently, students, including those in biology and in a program called Environmental Resources, visited the campus President to insist on establishment of a new program, and permission was granted to hire a director to coordinate the effort.

The first director of the Environmental Studies program at Sac State was Dr. Wes Jackson, a geneticist who had published a text used widely in courses on environmental problems. A curriculum was created and major and minors in Environmental Studies were approved in 1972, making the program one of the first of its kind in the U.S. At its inception and throughout is existence, the Environmental Studies program has emphasized the need to integrate concerns for social equity with environmental analysis, and included courses emphasizing environmental justice that would come to national prominence more than a decade later.

B. Students

Since 2008, enrollment in the Environmental Studies program (Table 1.1) has nearly doubled and increased an average of 10% annually, exceeding 200 majors and minors in spring 2015 and reaching a peak of 236 majors (BS/BA degrees) and minors in spring of 2016 (226 majors, 10 minors), representing an enrollment increase of 20% from fall of 2014 (data from Cognos). Juniors and seniors comprise 88% of the ENVS undergraduate population and a large majority these students transfer into the program each year from community colleges. We anticipate enrollment to continue to increase with interest in the major, stemming from increased concern with critical environmental issues such as climate change, loss of biodiversity, the California drought, and water quality issues in cities such as Flint, MI and Stockton, CA. Enrollment will also increase as a result of migration from impacted and other overenrolled programs at CSUS.

Table 1.1. Faculty numbers, enrolled majors, and admitted applicants in Environmental Studies since 2008.

Date	Full-time / Part-time Faculty	Enrolled Majors and Minors	Admitted Applicants	S/FTF Ratio
Fall 2015	3/7*	236	56	78.7
Fall 2014	3/7	196	51	65.3
Fall 2013	3/7	187	51	62.3
Fall 2012	2/7	180	41	90.0
Fall 2011	2/7	161	37	80.5
Fall 2010	4/3	144	51	36.0
Fall 2009	4/3	132	49	33.0
Fall 2008	4/2	122	96	30.5
Early 2000s	6/4	NA	NA	NA

*A new full-time faculty member will join the department in August 2016 bring the full-time faculty to 4 members.

The student body of the Environmental Studies Department is highly diverse (ENVS 2016 Fact Book - Table 2). In 2015, more than 34.5% of students were from minority populations while more than 24.4% were from underrepresented minority populations. In 2015, 47% of students were female and 53% were male, while nearly 50% of students were from low-income families and more than 17% were first generation college students.

Over 95% of students lived off campus and commuted to classes in 2015 (ENVS 2016 Fact Book - Table 2).

ENVS students enroll in an average of 12.4 units per semester (10-year mean, ENVS 2016 Fact Book - Table 6) and average unit loads have been consistently similar or slightly above college and university averages. Internal departmental analysis indicates that the average time to graduation for transfer students is 2.5 years or 5 semesters (too few freshman enroll in the curriculum to provide accurate time-to-graduation data). The two year graduation rate for the 2013 cohort of transfer students was 18%, the three year graduation rate for the 2012 cohort was 48%, and the four-year graduation rate for transfer students for the 2011 cohort was 70% (ENVS 2016 Fact Book - Table 15).

C. Degree Programs and Requirements

The Environmental Studies program presently offers BS and BA degrees as well as a Minor in Environmental Studies. The original (1972) curriculum was designed to address the intellectual need for a new approach to understanding and teaching about environmental problems. The philosophy that drove the creation of the Environmental Studies curriculum was that students should learn to integrate knowledge from science, social science, and humanities fields by focusing on biology/ecology, economics, quantitative and field methods, environmental ethics, international environmental problems, and environmental law and policy. These "integrative courses" helped students understand the scientific, social, political, legal, and cultural aspects of environmental problems within and outside of the United States. This emphasis on an integrative approach to the curriculum continues today.

While the original program was not designed with a focus on vocational outcomes for students, the curriculum turned out to provide excellent job training and ENVS students have consistently found jobs in the private and public sectors. Some Environmental Studies graduates also have gone on to earn graduate degrees in science and law.

In 2007 - 2008, the program was revised to move toward a more direct focus on science in understanding environmental problems, while continuing the integration of social science, economics, and policy in the program. This change reflected a national trend in direction of environmental studies programs and a recognition that students with a

strong STEM background and training were at an advantage when seeking employment. Therefore, the Environmental Studies Department revised its curriculum by adding a BS degree and additional courses/course requirements, for the degree. Since that time, the BS has become the most popular of the degrees offered in the program, with approximately 90% of ENVS majors taking and completing the degree.

Additional changes in the BS and BA degrees were implemented in 2014, resulting from a Departmental retreat conducted in 2013 under the direction of the new Department Chair. Changes were intended to eliminate courses that were no longer offered in the curriculum, to ensure that students took courses in a logical sequence as much as possible, and to clarify and strengthen prerequisites for some courses. Three new courses have also been added to the curriculum since 2014: Urban Agriculture and Aquaponics (ENVS 147), California Water and Society (ENVS 135), and Energy, Society, and the Environment (ENVS 110).

Courses, Availability, and Challenges

The Department offers 20 Environmental Studies courses taught by full- or part-time ENVS faculty while an additional 9 courses outside of ENVS are required to complete the BA or BS degrees (Appendix 1). Approximately half of ENVS courses are offered in the fall semester and half are offered in the spring semester.

Significant bottleneck courses offered by ENVS faculty include ENVS 112 (International Environmental Problems - writing intensive), ENVS 120 (Quantitative Methods), and ENVS 121 (Field Methods). Since 2013, these courses have been consistently fully enrolled with significant waiting lists. To address this problem, the department has taken the following steps: Increasing the frequency of each course from once per year to once per semester; offering two sections of ENVS 121 (Field Methods) in fall term 2016; and offering a summer session of ENVS 121 (Field Methods). While we anticipated that these steps would reduce the backlog of ENVS students waiting to take these courses and allow all ENVS majors to take these courses in the first year of study (for transfer students), increased enrollment in the ENVS program has resulted in some continuation of course backlogs in ENVS 112, 120, and 121. Additional steps, including providing multiple sections of these courses in each semester, may be required.

Biology 1, Biology 2/10, and Chemistry 1A/6A pose significant challenges for ENVS majors pursuing the BA and BS degrees. Incoming transfer students register for fall courses in the summer, well after continuing CSUS students have registered for fall courses. As a result, BIOL 1, BIOL 2/10, and CHEM 1A/6A are typically full and incoming ENVS students must wait to take these courses until at least spring term (if BIOL 1 and BIOL 2 are both needed, an incoming transfer will not take at least one of these courses until their senior year). As a result, incoming transfer students are unable to take any other course (within or outside of the ENVS curriculum) that has BIOL 1, 2, or 10, or CHEM 1A or 6A as prerequisites. Ideally, incoming transfer students would have taken their basic Biology and Chemistry courses at their junior college; however, approximately 80% of incoming transfers lack at least one, and typically more than one of these courses. A significant increase in the availability of Biology 1 sections occurred for fall term 2016, and virtually all incoming ENVS transfer students were able to enroll in Biology 1. Students were also encouraged to enroll in Chemistry 1A/6A during the summer, although the availability of these courses continues to be limited.

The effect of adding sections of ENVS 112, ENVS 120, ENVS 121, and Biology 1 (for fall term 2016) on the time-to-graduation for ENVS students is unknown at this time. While some improvement is expected, the most significant impact on time-to-graduation would result from a requirement that incoming transfer students complete Biology 1 and 2/10, and Chemistry 1A/6A at their community college prior to enrollment in the ENVS curriculum.

D. Faculty and Staff

Presently, the Environmental Studies Department has four full-time, tenure track faculty, one emeritus faculty member teaching part-time under the FERP program, and eight, part-time (temporary) faculty. One Administrative Support Coordinator (ASC1) provides administrative and other support services to the department. Of the 4 full-time faculty 50% are female and 50% are male while 25% of part-time faculty are female and 75% are male. Eight percent of ENVS faculty are underrepresented minorities and 2 of 4 full-time, tenure track faculty have been awarded tenure.

Environmental Studies Faculty and Staff

Jeffery A. Foran (Department Chair)
Michelle Stevens (Associate Professor)
Julian Fulton (Assistant Professor)
Sara Kross (Assistant Professor - beginning August 2016)
Dudley Burton (Professor Emeritus)
Christine Flowers (Part-time)
James Goldstene (Part-time)
Catherine Ishikawa (Part-time)
Brook Murphy (Part-time)
Christopher Papouchis (Part-time)
Gregory Popejoy (Part-time)
James Reede (Part-time)
Michael Wenzel (Part-time)
Donna Leiva (Administrative Support Coordinator).

The mission of the Environmental Studies Department has remained fundamentally unchanged from the program conceived in the 1970s. However, the program has gone through a number of transitions associated with faculty departures, budgetary challenges, and programmatic emphases. In the early 2000s, increased student interest and enrollment in the program were not accompanied by increased faculty to support the program and teach its courses. From 2007 to 2011, the number of full-time faculty decreased to 2 and the program was a candidate for elimination.

In 2013, a new Department Chair was hired, bringing the number of full-time faculty to 3. A full-time faculty member was added in January 2016 while a long-time faculty member and former chair retired in August 2015 (now teaching part-time under the FERP program). Another new, full-time faculty member joined the department in August 2016 bringing the number of full-time faculty in ENVS to four. Eight individuals provide teaching services to the department on a part-time basis.

The ENVS Department's student/full-time faculty ratio (S/FTF) of 79:1 (Table 1.1), which has more than doubled since 2008, places ENVS among SSIS departments with the highest S/FTF ratios. Without further enrollment increases, this ratio will decline to approximately 64:1 upon arrival of a new full-time faculty member in August 2016, although it will remain in the top tier of ratios within SSIS. ENVS courses are fully enrolled

and the Department has added sections in many cases to accommodate increased enrollment from within and outside of the program.

E. Facilities

The ENVS offices are located on the 5th floor of Amador Hall. The ENVS suite contains 5 faculty offices, a small conference room, a small mail/copy/supply room, and the Departmental office. An ENVS laboratory has been established in Room 123A/B/C Amador Hall. The laboratory contains equipment for teaching field methods courses (e.g., drying ovens, scales/balances, microscopes) and adequate storage space for course equipment. ENVS courses are taught in buildings/rooms throughout the Sac State campus, and several courses rely heavily on field-based activities.

F. Alumni Information

The Office of Institutional Research (OIR) conducted a survey of ENVS alumni during 2013 (additional discussion of, and a link to the survey are available in Section II.B.). The survey was distributed to 141 ENVS graduates who received degrees between 2007 and 2011, and 41 responded (response rate - 29%). Thirty percent of respondents were female and 70% were male, 66% were white, 6% were Asian, 6% were Mexican/Hispanic/Latino, and Pacific Islander/Native Hawaiian, Native American, and African American each comprised 3% of respondents.

Of all respondents, 80% were employed part- or full-time, or were attending graduate/professional school at the time of the survey. Fifty-one percent of respondents were employed with the local, state, or federal government, 18% were employed in the private sector, 13% were attending graduate school, 11% were employed in the non-profit sector, and 7% were participating in career training or other instruction. Forty-three percent of respondents were working in a job related to the major, used skills learned in the major, or were working in a job related to their desired career path.

Overall, ENVS alumni and graduating seniors were highly satisfied with the education they received at Sac State. More than 70% of respondents were satisfied (somewhat or very) with the quality of faculty instruction they received, with the quality of their major courses, with the course schedule (which allowed them to graduate in a

"reasonable period of time"), and with their overall experience in the major. Seventy percent of ENVS majors indicated that they were provided with the discipline-specific skills to succeed in their chosen field while 80% indicated that they were provided with an appropriate understanding of the methods and practices of the profession.

G. Response to the 2009 Program Review

The Program Review completed in 2009 offered numerous recommendations, which are listed below. The assessment concluded that:

> Without question, the review team along with the Dean, assessment coordinators, and external reviewer are impressed with the assessment progress and structure that the Environmental Studies faculty members have developed in a short period of time. Not only are they leaders within their college, but their work can help other departments in colleges beyond their own to make progress on their own assessment needs. Although their assessment efforts have been good, the review team, with assistance on the part of Dr. Terry Underwood, has recommendations for the Environmental Studies Program to further develop their assessment efforts.

RECOMMENDATION 1: Take another look at the exit survey and the "narrative statements." The narrative statements might be used to assess both satisfaction and learning. It would be possible to develop structured reflective prompts that require students to describe in detail what academic concepts and methods that they applied in their internship or in a field project. They could then analyze their descriptions and formulate "articulated learning" statements - statements of learning that students themselves key to the program outcomes - as well as reflective commentary that gets at level of satisfaction, conditions for learning, and other similar outcomes.

> Response: The exit surveys are examined very carefully and have been analyzed/discussed as part of the 2015/16 assessment process.

RECOMMENDATION 2: In the Environmental Studies 07-08 Assessment Report, the department notes that they have adopted a simple "evaluation metric for all assessment activities" that are generally scored from 1 (meets or exceeds) to 3 (fails to meet) on meeting learning objectives. While this is important, make sure that you are diligent in obtaining inter-rater reliability amongst faculty in these scorings. In order to ensure that there is consistency, faculty need to continue to score similar papers each year to make sure that the metric is reliable.

> Response: The annual assessment process has been, at best, haphazard since 07-08, with most evaluations focused on course-specific learning objectives. An assessment of program learning outcomes is beginning with this Self-Study, and a comprehensive plan for assessment of program learning outcomes is presented as part of the 2015/16 Program Review Self-Study.

RECOMMENDATION 3: Consider how to get the most useful data from the internships. It is suggested by the review team (and Dr. Terry Underwood) that Environmental Studies consult with programs that have a history of field-based observational assessment techniques such Physical Therapy, Kinesiology, Teacher Education, and Engineering for ideas of how to set up assessment mechanisms that are effective and efficient.

> Response: A comprehensive reporting mechanism for internships has been developed and implemented (available in the internship handbook). The assessments are generally used to determine the appropriateness of internships at specific sites and with specific organizations.

RECOMMENDATION 4: Further develop the embedded-question approach. Look at what the Math Department is doing in terms of vetting exam questions and try something similar. Consider elaborating on the rubrics so that they are useful not just to faculty in reporting but also to students as they do their learning activities. As they stand, the professors know what "meets the standards means," but the criteria that show "meets the standards" are still a mystery to students. Spelling out criteria will stimulate discussion

about assignments and expectations among the faculty, which can be very healthy and beneficial.

Response: See response to Recommendation #2.

RECOMMENDATION 5: Consider using the writing of an environmental impact report as a summative assessment. This is a core assignment in the program in that it improves students' likelihood of getting a job and provides an opportunity for them to pull together their learning. It would be useful for faculty to collaborative on the design of an assessment "package" that frames this work for students and then a rubric that could be applied to examples.

Response: This recommendation may be useful for ENVS 122 (CEQA/NEPA), although it is the purview of the instructor to determine whether this is an appropriate class exercise. However, the capstone project for the ENVS BS and BA degrees is a thesis and there is consensus among the ENVS faculty that a wide array of thesis topics should be available to students, many of whom may not be engaged in jobs that require knowledge of CEQA/NEPA upon graduation.

RECOMMENDATION 6: Pursue the alumni surveys. Clearly, this program has the potential to make a huge impact on the region and beyond; it would be good to know what this impact is, especially given the struggle for resources. Data like these could be important in bringing more faculty members to campus, arguing for improved access to laboratory space and equipment, and the like.

Response: Alumni surveys have not been aggressively pursued; as a result, data on ENVS alumni are not comprehensive and, therefore, are unavailable for detailed assessment. A more rigorous alumni survey is desirable and will be pursued through OIR; however, we have found OIR to be difficult to work with and obtaining alumni information from that office has been challenging.

RECOMMENDATION 7: The department needs to be vigilant in their pursuit of additional hires when faculty positions become available.

> Response: The department has been aggressive in its pursuit of additional faculty hires, but has been constrained by College and University resources and prioritization of faculty hires at the Dean and Provost levels since 2009. ENVS was able to hire a new Department Chair in 2013, and two new full-time faculty members were hired in 2016. A new hire (full-time, tenure track) has also been authorized for 2017/18. The Department is now on track to recover lost faculty and reduce its student faculty ratio considerably.

RECOMMENDATION 8: When positions are made available, the department should carefully reflect on the need for new faculty positions with respect to what is currently offered by the Environmental Studies program and the desire to add the BS degree. As such, the review team recommends that the department prioritize hiring an environmental scientist, policy law, generalist (faculty that has the ability to teach environmental science and policy law), in that order.

> Response: The Department, through the hiring of a new Department Chair in 2013 and two full-time faculty in 2016, fulfilled these priorities. It is now pursuing additional faculty to meet the teaching, research, and diversity needs of the Department.

RECOMMENDATION 9: Reassess your process of providing student advising. Consider working or at least talking with students in classes such as 190A to help determine where there are perceived deficiencies in the system and ways that the department might better meet the advising needs of students.

> Response: The Department Chair has taken the lead for student advising and has implemented procedures and processes that have been used successfully in other SSIS departments.

RECOMMENDATION 10. Develop a system to maintain a large and current database of student internships and be sure to develop a system that will make students aware of such a database early and often in their program.

Response: An internship database has been developed, is published on-line (on the ENVS web site) and is carefully monitored and updated.

RECOMMENDATION 11. Given the likely increase in internships, the Department should be clear of the types of experiences that will qualify to fulfill this requirement and the ways in which students will produce outcomes that can be adequately assessed.

Response: The ENVS Department Chair, in consultation with the ENVS faculty, periodically evaluate internships and determine which internships, and internship types are suitable for ENVS students.

RECOMMENDATION 12. In light of a potential wave of independent study projects that faculty may suddenly be faced with overseeing, the department should develop shared guidelines on the expectations of the types of assignments that are expected for such a project.

Response: Guidelines for independent study projects have been developed. However, the Department generally discourages independent projects as student responsibilities for thesis and internships require significant time and commitment and are required for completion of the degree.

RECOMMENDATION 13. The Department should produce clear ENVS 198 guidelines for students so that they are aware of the expectations of them when undertaking such a course.

Response: Completed (development of individual guidelines is the responsibility of the supervising faculty member)

RECOMMENDATION 14: Explore a discussion with appropriate bodies on possibilities of implementing course fees in the current system.

Response: A course fee system has been implemented.

RECOMMENDATION 15: Identify those courses in which course fees are appropriate and identify the total dollar amount for course fees. In the event the department is unable to immediately implement course fees, they should be positioned to implement such changes when the moratorium is lifted.

Response: Implemented/Completed.

Section II. Assessment of Learning Outcomes

A. Summary of Previous Assessments

A qualitative annual program assessment was conducted for the 2013-2014 academic year and a report was submitted that presented the results of the assessment. An annual assessment was not conducted for AY 14/15 due to confusion with requirements for annual and program assessments, and lack of a comprehensive assessment strategy (Tables 2.1 and 2.2). The AY15/16 assessment of writing skills is presented in Section 2.B. A formal program assessment strategy has been developed and will be implemented annually as indicated (Section 2.C, Table 2.3).

Table 2.1. Summary of program assessment in the current program review cycle

List of all the degree programs for the Academic Unit	Developed an assessment plan	Updated the assessment plan	Developed PLOs	Developed/ adopted expectations/ standard/criterion for the PLOs	Explicitly Assessed PLOs	Collected program data	Used data for improve-ment	Previous Fall Enrollment	External Accredited
I. Bachelor Degrees									
1 BS	yes	yes	yes	partially	partially	partially	in process	191	No
2 BA	yes	yes	yes	partially	partially	partially	in process	0	No

Table 2.2. Inventory of education effectiveness indicators for program learning outcome.

Questions / **Year of Assessment**	What PLOs are **explicitly** assessed this year	Where are these PLOs published? (Please specify)	Other than GPA, what data/evidence[1] was used to determine that graduates have achieved stated outcomes for the degree?	What are the expectations and/or criterion for assessing these PLOs? Please attach the rubric as appendices if any?	What were the findings? What percentages of students met the expectations[2] (both aggregated and disaggregated)?	Who interpreted the evidence? What was the process?	How were the findings used? By whom?	Date of the last program review?
2015-2016	**Writing proficiency**	**On-line and in the Self-study**	**Final thesis, submitted coursework. See self-study**	**Rubric presented in the self-study**	**PLO has not been achieved - see report**	**External consultant - see report**	**Under considerat ion by departme nt**	**2009**
2014-2015	**None**							
2013-2014	**None**							
2012-2013	**None**							
2011-2012	**None**							

B. Results from the Alumni Survey

Students who graduated from the ENVS program between 2007 and 2011 indicated a high level of satisfaction with the ENVS program and very significant achievement of program learning objectives (full survey results are available by clicking here). Ninety-seven percent of individuals responding to the Alumni survey indicated that the ENVS major helped them develop the ability to extract and construct meaning through interaction and involvement with written language. Eighty-two percent indicated that the ENVS major helped develop critical thinking skills, 94% indicated that the ENVS major helped develop creative thinking skills, 91% indicated that the ENVS major helped them develop the ability to understand and use quantitative information, 94% indicated that the ENVS major helped develop effective writing skills, and 97% of respondents indicated that the ENVS major helped develop effective oral communication skills.

C. Assessment of Writing Skills

The Environmental Studies program Learning Objective A - *Ability to write and speak clearly and persuasively*, was assessed quantitatively during the 2015-16 academic year. The assessment was conducted by an external consultant to ensure objectivity and because so few faculty are available in ENVS to conduct quantitative assessment of learning objectives.

Methods

Two sets of writing assignments were analyzed to compare students completing the program with those in earlier stages of the program. For students finishing the program, senior theses drafts were analyzed. All students in the major must complete a senior thesis to graduate, and because they generally take the thesis class during their final semester, theses provide a good estimate of writing skills students have when graduating. Thesis first drafts were analyzed because final drafts were influenced by the thesis instructor's advice and edits. This choice may have underestimated students' abilities, given that they knew it was a first draft and that they may have learned more about writing through meeting with the instructor.

The writing assignment used to evaluate students near the beginning of the program was the first writing assignment for ENVS 112, "International Environmental Issues, " a writing-intensive course. For this assignment, students wrote a page in class about an environmental issue that interested them. They took their in-class drafts and submitted them as a one-page draft that the course instructors commented on. Students then researched their issue and expanded the paper to two pages. While students submitted a revised version of this paper, their first two-page version was analyzed to minimize the influence of instructor advice and editing.

The rubric for evaluating student writing considered performance in the following areas: Thesis or Focus, Organization, Support and Reasoning, Style, and Writing (Appendix 2), adapted from Northeastern Illinois University's writing rubric). This rubric contains similar skills as the AAC&U's LEAP VALUE Written Communication rubric, but skills were organized in a way the rater found more intuitive and easy to apply. The four proficiency categories match well between the two rubrics, so a 4 ("High Proficiency") on our rubric corresponded to a 4 ("Capstone") on the VALUE rubric, and so on for the lower categories.

Results and Discussion

Senior Thesis

The goal of having at least 70% of students leave with scores of "3-Proficiency" or "4-High Proficiency" was only met for the Style category. Style had over 70% of students in the Proficiency or High Proficiency categories, while other criteria had only 45% to 50% of students in the Proficiency or High Proficiency categories (Table 2.3). All students had at least some proficiency in style and mechanics and all but one had some proficiency in organization. In general, students were able to construct sentences well and to write in a fairly professional tone. Overuse of strong modifiers and informal phrases were the most common reasons for students receiving "2-Some Proficiency" scores for style. For mechanics, some students may have not submitted their cleanest effort because they knew this was a draft. However, most papers that fell in the "2-Some Proficiency" category for mechanics had errors that repeated. Missing or misplaced commas were common, but run-on sentences and sentence fragments were rare, with only one or two occurring in a paper, if at all.

Table 2.3. Percent of ENVS 190 students (n = 22) receiving scores for five criteria.

	4 High Proficiency	3 Proficiency	2 Some Proficiency	1 Limited Proficiency
Thesis/Focus	14%	32%	36%	18%
Organization	14%	36%	45%	5%
Support/Reasoning	5%	41%	36%	18%
Style	5%	68%	27%	0%
Mechanics	0%	45%	55%	0%

Organization may have been better than the scores suggest. Each paper had sections arranged in a reasonably logical way, so large-scale organization was fairly proficient for most papers. For three papers, low scores on organization were due to the paper appearing to be written in a scientific paper format but not following the organizational conventions for such a paper well. Most other issues appeared at the paragraph level. For example, some papers had long paragraphs with multiple topics that should have been broken into several paragraphs. Other papers had paragraphs that stuck to one topic, but had topic sentences that did not reflect the topic or help lead the reader through the paper.

The Thesis/Focus and Support/Reasoning categories had more papers that did not meet the qualifications for "2-Some Proficiency" than other criteria had (Table 2.3). No paper received a "Limited Proficiency" rating for Style or Mechanics; four papers received a "Limited Proficiency" score for Thesis/Focus and four received "Limited Proficiency" for Support/Reasoning. Papers receiving this low rating for Thesis/Focus essentially had no statement of their goal or purpose for writing the paper (though in one case the title described the focus well). Reasons for low support and reasoning scores varied. Two papers appeared to be written with a scientific format but only presented results—no analysis or discussion of the results were present. Another paper had strings of facts and statistics with no connection between them or to the thesis. The fourth paper had limited analysis, with factual errors and overgeneralizations permeating what little analysis was there.

Paper for ENVS 112

Score distributions tended to be lower for ENVS 112 papers than they were for thesis for some criteria (Table 2.4). In particular, Thesis/Focus, Support/Reasoning, and Style criteria appear to be higher for students later in their course of study, especially when looking at the percentage of papers scoring in the proficient or highly proficient categories (Figure 2.1). Part of the improvement in the "Thesis/Focus" criteria may be due to the fact that students in 112 had less time to choose their topic, and instructions for the paper did not specify that their paper should state the purpose of the paper somewhere. Thesis students, on the other hand, had written a prospectus, and the instructor had used the prospectus to help students narrow and define their topic.

Table 2.4. Percent of ENVS 112 (n = 12) receiving each score for five criteria.

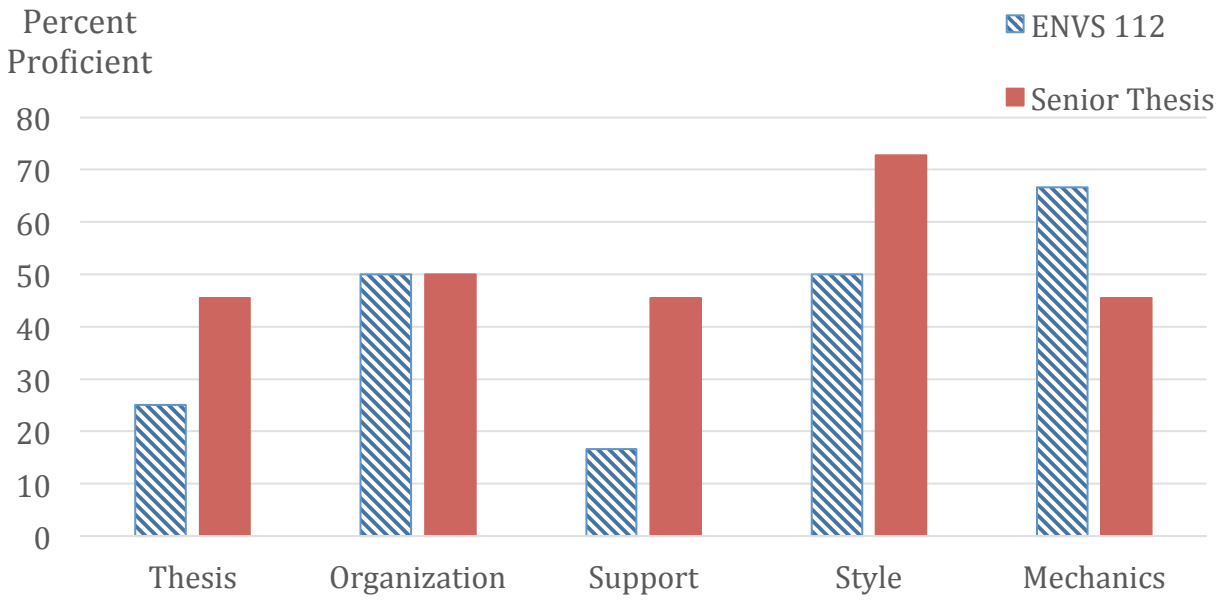
	4 High Proficiency	**3 Proficiency**	**2 Some Proficiency**	**1 Limited Proficiency**
Thesis/Focus	0%	25%	25%	50%
Organization	8%	42%	33%	17%
Support/Reasoning	8%	8%	67%	17%
Style	0%	50%	50%	0%
Mechanics	8%	58%	33%	0%

The length of the assignments may have also led to differences in scores. For example, proofreading two pages takes less effort than proofreading 15 to 20, which may help explain the higher percentage of students with proficient mechanics in ENVS 112. Also, students in ENVS 112 may have perceived that with only two pages they did not need to provide much supporting evidence. Students with 2 or 1 scores for "Support / Reasoning" often used one anecdote, described in detail, to support a broad generalization. While some students successfully gave an appropriate amount of evidence, more might have done so had they perceived the assignment as more demanding.

Conclusion

ENVS students are generally not meeting the 70% threshold for proficiency or high proficiency in their writing (Figure 2.1). While some improvement (in Thesis, Support, and Style) occurred between the time students took their writing intensive course (ENVS 112) and wrote their thesis (ENVS 190), students reached the proficient threshold at thesis only for Style, while writing performance for Mechanics declined between ENVS 112 and ENVS 190. ENVS faculty will begin discussions of this issue and determine how to improve writing performance in the Environmental Studies program.

Figure 2. Percent of papers from two classes that received ratings of "Proficiency" or "High Proficiency" for five criteria. ENVS 112, a Writing Intensive course, is normally taken early in a student's course of study; Senior Thesis is normally completed during a student's final semester



D. Assessment Plan for the Next Review Cycle

A five-year plan for program assessment has been developed and includes an approach for departmental assessment efforts (per PRM II.2.3), assessment strategies,

ENVS learning outcomes to be assessed, and attention to questions such as whether and how capstone courses and other core courses can be used appropriately for assessment (Table 2.3). The Department of Environmental Studies developed its Program Learning Objectives in 2006/2007, and of eight objectives, four were identified as key outcomes in the 2010-11 assessment:

Ability to write and speak clearly and persuasively

Ability to assess environmental problems and solutions by applying scientific concepts

Ability to carry out research tasks appropriate to analyzing environmental problems

Ability to assess environmental problems and solutions by applying economic and political concepts

Ability to integrate knowledge, research, and interpretation with substantially greater sophistication than commonly expected in coursework.

ENVS student abilities to write clearly and persuasively were assessed quantitatively during AY 15/16. The remaining four Program Learning Objectives will be assessed over the next five years (Table 2.3).

Table 2.3. A comprehensive assessment plan for all the programs in the next program review cycle for ENVS BS/BA degrees.

Program Learning Goal	Corresponding Program Learning Outcomes (PLOs). (Each must directly relate to one or more Program Goals)	In which course(s) will the PLO(s) be assessed?	In which year will the PLO(s) be assessed and how often?	What types of assessment activities[1] will be used to collect the data?	What types of tools[2] will be used to score/evaluate the activity? Who will develop/modify the tool and/or evaluated the activities?	How will the data be collected? By whom?	How will the data be reported[3] (both aggregated and disaggregated), and by whom? What will be the standard of performance?	Who will analyze the data?	How will the data be used? By whom?
I.	Ability to write clearly and persuasively	ENVS 112, ENVS 190	AY 15/16	Student theses, course-based writing assignments	Rubric-based analysis of writing proficiency. External consultant	Analysis of writing - conducted by external consultant	aggregated/disaggregated Report prepared by external consultant, presented to faculty. 70% of students leave the curriculum proficient or highly proficient in each category	External consultant	Presented to faculty. Used to modify courses/pedagogy as necessary
II.	Ability to carry out research tasks appropriate to analyzing environmental problems	ENVS 121, ENVS 130, ENVS 190 (other courses with integrated research opportunities)	AY 16/17	Evaluation of student research skills in conjunction with SIRIUS/CUREs assessment process	Student surveys, self and directed analyses, evaluation of research products	In class via surveys. Collected by course faculty.	Survey and student response results. Quantitative analysis of survey data in conjunction with SIRIUS.. 755 of students are able to understand and apply basic research design, analyses, and text appropriate hypotheses.	Faculty	By faculty to improve incorporation of research opportunities into existing courses
III.	Ability to assess environmental problems and solutions by applying scientific concepts	ENVS 120, 121, 130, 144, 147, 149, 151, 158, 163	AY 17/18	Student performance, survey tools	Surveys and self-and course-based analyses	In class, collected by faculty	Quantitative analysis of survey data in conjunction with SIRIUS. Other objective measures. 75% of students capable of applying scientific concepts to assess and solve environmental problems	Faculty	By faculty to improve coursework and pedagogy, as well as experiential learning opportunities
IV.	Ability to assess environmental problems and solutions by applying economic and political concepts	All ENVS upper division courses	AY 18/19	We will seek external, professional guidance to develop the approach to this assessment	TBD	TBD	TBD	Faculty	75% of students are able to apply economic and political concepts to assess and solve environmental problems
V..	Ability to integrate knowledge, research, and interpretation with substantially greater sophistication than commonly expected in coursework	Selected ENVS upper division courses	AY 19/20	TBE - We will seek external professional guidance to develop the approach to this assessment	TBD	TBD	TBD	Faculty	75% of students are able to effectively integrate knowledge, research, and interpretation

Section III. Focused Inquiry

The goal of the Focused Inquiry is to evaluate the Environmental Studies program to ensure that it is offering knowledge, skills, and experience that reflect the state of the discipline. To that end, we conducted a comparative evaluation of the CSUS Environmental Studies mission and the missions and program components of Environmental Studies programs within and outside of the CSU system. As a majority of Environmental Studies graduates pursue careers in state government, we also evaluated knowledge and skill requirements for entry-level environmental positions to ensure that the our program is preparing students appropriately to pursue careers in state government as well as other sectors that address environmental issues. Finally, we offer recommendations for future growth and development of the Department and the program.

A. Environmental Studies at CSUS

The mission of the Department of Environmental Studies (ENVS) at CSUS is to:

> *prepare students to understand and address environmental problems in their political, economic, social, ethical, and scientific contexts. We promote the use of an interdisciplinary approach to teaching and research, and we encourage the development of strong writing, research, and quantitative skills that give students the ability to identify the causes and consequences of human influence on the environment and to work toward sustainable solutions to complex environmental problems.*

The location of the Environmental Studies Department in the College of Social Sciences and Interdisciplinary Studies reflects the interdisciplinary approach that the Department uses to pursue its educational mission. While the program is focused on providing a comprehensive scientific and technical curriculum, it also strives to integrate social, ethical, political, and economic perspectives and concepts.

There are eleven Environmental Studies Programs within the CSU system (analysis available by clicking here - this is a large file and may take some time to load). These programs emphasize the value of working at the interface between human and natural

systems, and the integration of scientific knowledge with economic, political, social, and ethical concepts. Eight of eleven Environmental Studies programs with the CSU system offer a BA degree in Environmental Studies while three - Sacramento, Sonoma, and San Jose - offer a BS or both BS/BA degrees. CSU Dominguez Hills and CSU San Jose offer an MS in Environmental Studies.

Most Environmental Studies programs within the CSU system require basic biology, chemistry, and math (statistics) either upon entrance or to progress to more advanced courses. Concentrations within programs are relatively common and include such areas as environment and society, sustainability, energy and climate, environmental policy, environmental management, water resources management, and environmental design. Two CSU ENVS programs (San Diego and San Luis Obispo) are presently impacted.

Several Environmental Studies programs outside of the CSU system were also reviewed for mission and program structure including the University of Oregon, the University of Michigan, the University of North Carolina, University of Colorado, and Amherst College. Environmental Studies programs at these universities have a mission that is consistent with the program at CSUS. They offer an interdisciplinary approach to exploration of environmental problems and the interactions between humans and nature (ecological systems). The programs require grounding in natural sciences as well as the humanities and social sciences, and all include course requirements in biology, chemistry, and statistics as well as economics, policy and politics, and courses in the social sciences. Of particular note among these programs is the composition of their faculty, which is commonly drawn from a variety of departments and programs throughout the university. For example, the University of Oregon has over 100 participating faculty from 30 campus programs and departments.

Finally, the CSUS program emphasizes experiential learning opportunities through its internship program, in some cases through thesis projects that are research based, and through integration of undergraduate research opportunities in several courses (through SIRIUS/CUREs and directly). Most of the reviewed programs do not emphasize experiential learning, although several appear to offer internship opportunities within their programs. This may be an area where CSUS can differentiate itself as a leader in providing unique

experience and student opportunities through its undergraduate degree program in Environmental Studies.

B. What We Offer and What Is Required

The Environmental Studies faculty held a retreat in August 2016 to agree on the nature and extent of knowledge that students should possess upon completion of the Environmental Studies program. We believe that Environmental Studies students should care about:

- protecting the environment
- ethics, justice, human rights, and cultural diversity
- taking rational risks and recognizing their own abilities.

We also feel that Environmental Studies students should be able to:

- assess the quality of information
- evaluate competing perspectives on environmental issues
- apply knowledge critically
- conduct research, pursue knowledge creation, and expand understanding
- make decisions in an ethical context.

To ensure success in the workplace, in graduate school, and in any endeavor that requires knowledge of the environment and environmental issues, students should possess core knowledge of:

- ecology/sustainability
- interactions of humans and the environment
- conservation, restoration, and natural resources management
- how government works and how to shape policy
- how to use information resources
- data collection and management
- quantitative methods
- field/laboratory methods.

Students should also possess an understanding of:

- the nature and limitations of science
- the nature and limitations of politics
- human nature and its impacts on environmental choices
- moral, ethical, cultural, and social boundaries of issues
- the limits of their own knowledge.

While ENVS students may possess this knowledge and these characteristics when they complete the Environmental Studies Program, objective assessments have not been conducted to evaluate student knowledge and characteristics. We also believe that students possessing the core knowledge and characteristics upon graduation from the program are adequately prepared to successfully complete state entrance exams and enter state civil service. To confirm this belief, we evaluated entrance exams for state employees to determine whether courses and other opportunities in the ENVS curriculum provide the knowledge, skills, and experience required to pass these exams.

The general knowledge required for the state Environmental Scientist civil service exam is provided in the CSUS Environmental Studies curriculum through required and elective courses (Appendix 3). The curriculum also provides significant experiential learning opportunities, consistent with the "experience" required on the consortium exam, through required and elective coursework as well as through internships and guided research. The California Water Resources Control Board (Appendix 3) requires a separate exam for applicants, which has extensive knowledge and skill requirements. No single position requires all knowledge and skills, but the majority of knowledge and skills for all positions are addressed in the CSUS Environmental Studies curriculum. Exceptions include knowledge and skills in land use practices (a few ENVS students have pursued courses at UC Davis in this area), performance of ecological risk assessment (an advanced skill usually provided in a graduate program), and development of tools to address watershed pollutant reduction (typically provided in a water quality concentration or in a graduate program). The ENVS program also does not focus heavily on groundwater monitoring and assessment, although these skills are available through the Geology curriculum and may be

incorporated in a joint ENVS/GEOL Field Methods course that is under development. Some areas where knowledge/skills/experience are not available in the ENVS curriculum (e.g., land use planning) are under consideration for incorporation in the program as the Department conducts a search for a new full-time faculty member.

C. Department Status

The ENVS program at CSUS has been growing consistently over the last 5 years with the largest enrollment increase (20%) occurring from 2014 to 2015. The number of full-time faculty in the program increased to four in 2016, and the Department will add another full-time faculty member in fall of 2017. Faculty workload in the Department is consistent with University and union guidelines, with full-time faculty required to teach 12 WTUs (weighted teaching units - the equivalent of 4 courses each with enrollment of 30 students) unless release time is granted for research or other supported activities. Presently, two newer professors have received reduced teaching loads for the first two years of service, with expectations for development of research programs. Subsequently, and for more senior faculty, teaching load reductions are to be supported by grants or other external funding sources.

A single Administrative Coordinator (ASC1) provides all administrative support for the Department. ENVS classes are held throughout the CSUS campus while the Environmental Studies office complex is located on the 5th floor of Amador Hall. Office space for full-time faculty is adequate; however, office space is inadequate for part-time faculty and additional office space is not available for new full- or part-time faculty. The ENVS Department acquired laboratory space in Amador Hall during the summer of 2016 and the space is presently utilized by the Department's field and laboratory courses. Equipment needs are significant and support from the College has been provided to meet minimum, course-related equipment needs in the Department.

The Environmental Studies faculty share a commitment to train students for, and connect students to, employment and other opportunities, promote scientific literacy, and advance knowledge. We do this through our teaching, by providing experiential and other learning opportunities, and through our research and service. We conclude that the Environmental Studies program provides a consistent, high quality education for our

students. We also believe that the program has several strengths, as well as some challenges. Our strengths include:

- A commitment to teaching and reaching students, including non-traditional students
- Attracting a diverse student body with varied interests and paths to making a difference in the world
- A commitment to student-involved research
- A focus on real-world problems
- The interdisciplinary, system-oriented, and applied nature of our program
- The rigor of our program
- The focus of our program on higher order thinking skills
- The focus of our program on social, economic, and environmental equity
- Our ability to think globally and act locally - impacting our campus, our community, and beyond
- The incorporation of external expertise, through our part-time faculty, in our curriculum

Our challenges include:

- Addressing the view in other Departments and programs that the Environmental Studies curriculum is not appropriately rigorous for a STEM discipline
- Properly identifying and communicating our program strengths to external partners and stakeholders
- Communicating and demonstrating the unique value of our program to students seeking careers in an environmental field.

Ultimately, the Environmental Studies faculty aspires to the following:

- Ensure that the university and community recognize and support our program and its strengths
- Ensure that basic student learning goals are met by incorporating program assessment into specific courses or as program requirements
- Achieve better connections between our program and the Sacramento community

- Achieve a better understanding of our alumni
- Achieve greater support for student research
- Ensure the existence of a positive reputation and strong link with California policy community
- Ensure the existence of a positive reputation and strong link with California environmental community
- Ensure the existence of a positive reputation and strong link with other STEM programs and instructors

D. Recommendations

To ensure that the Environmental Studies Program at CSUS continues to serve its student population, the College, the University, and our community, we recommend:

- **Increasing the number of full-time faculty in the program to match student enrollment, to reduce the student/full-time faculty ratio, and to reflect the continuing evolution and advancement of environmental knowledge.** The Environmental Studies Department has one of the highest student/full-time faculty ratios in the University. While significant teaching responsibilities are carried by our part-time faculty, these faculty cannot provide additional departmental and student support for activities such as research, internal and external experiential learning opportunities, and departmental service and support. We must continue to add full-time faculty to support our existing student body, the growing number of new students entering the program, and to support the development and conduct of a Masters program in Environmental Studies.

- **The development of an Environmental Studies Masters Degree.** Presently, only two CSU Environmental Studies programs offer Masters degrees, although most programs outside of CSU, including those reviewed for this program assessment, offer MS and Ph.D. degrees in Environmental Studies. The Environmental Studies program at CSUS is growing and many of our students pursue graduate education

after completion of their Bachelors Degree. We also have a core faculty that conducts high quality research that is amenable to graduate student participation and that requires longer term participation and commitment provided by graduate students. Our program also offers unique opportunities to conduct research applicable to the regulatory and decision-making community in Sacramento. Finally, the program is reaching a critical faculty mass of faculty that could effectively serve a graduate program.

- **The development of concentrations within the Environmental Studies undergraduate program.** The majority of Environmental Studies programs within and outside of CSU offer program concentrations within the Environmental Studies curriculum. Program concentrations provide students an opportunity to focus more heavily on a specific environmental topic and develop their understanding of, and skills in that topic. This preparation is likely to increase the attractiveness of our students to state and other employers, particularly as the environmental field becomes more specialized. Program concentrations will also allow some students to focus on topics that would more readily lead to graduate training and research. While students should not be required to choose a concentration (some students may choose a more general environmental studies education), we believe that concentrations should be made available to those students who may benefit from them.

- **The acquisition of additional staff to support our programs and initiatives including internships, partnerships, research, outreach, program assessment, and course development and coordination.** Presently, a single ASC1 provides all administrative support to the Environmental Studies program. Programmatic administrative requirements are increasing around internships, field experiences, as well as from the addition of new faculty and students. Administrative needs will also increase with the addition of a Masters program; therefore, we strongly recommend the addition of a second ASC1 to the department.

- **Strengthening the interdisciplinary basis of the Environmental Studies program.** The program is presently highly and appropriately interdisciplinary; however, we encourage additional interactions with other CSUS departments and colleges, through research and co-teaching courses with other faculty within and outside of the Environmental Studies Department. We also recommend drawing more heavily on local and regional expertise (e.g., recruiting part-time faculty from state agencies) to ensure that the ENVS program retains its value to students and to potential employers.

- **The development and implementation of effective assessment strategies for the program, its learning outcomes, and its aspirations.** To effectively evaluate achievement of learning and other program objectives, assessment must be conducted objectively, continuously, and thoroughly. This will require dedicated program assessment staff and appropriate funding for assessment programs. We also recommend that the results of comprehensive, objective assessment be used to revise and improve each component of the Environmental Studies program, including teaching, research, and service.

Appendix 1

Course Requirements for the BS and BA Degrees

Bachelor of Arts (B.A.)

Total units required for the major: 65

(Courses listed below the required courses in parentheses are prerequisites.)

A. Required Lower Division Courses

____ BIO 1 Biodiversity, Evolution, and Ecology

____ BIO 2 Cells, Molecules, and Genes **or both** ____ BIO 10 Basic Bio Concepts **and** ____ BIO 15L

____ CHEM 1A General Chemistry I **or** CHEM 6A Intro to General Chemistry

____ ECON 1B Introduction to Microeconomic Analysis

____ ENVS 10 Environmental Science

____ GEOG 1 Physical Geography **or** ____ GEOL 10 Physical Geology

B. Required Upper Division Courses

____ BIO 160 General Ecology

*(Prereq: ____ BIO 10 Basic Biological Concepts, **or both** ____ BIO 1 and ____BIO 2) **and***

(Prereq: ____ STAT 1 Introduction to Statistics)

____ ENVS 111 Environmental Ethics

(Prereq: ____ ENVS 10 Environmental Science)

____ ENVS 112 International Environmental Problems

(Prereq: ____ WPJ Examination already passed with score of 80+)

____ ENVS 120 Quantitative Methods for Environmental Science

(Prereq: ____ STAT 1 Introduction to Statistics & Instructor permission)

____ ENVS 121 Field Methods in Environmental Science

*(Prereq: ____ BIO 160 General Ecology,____ CHEM 1A General Chemistry I **or** ____CHEM 6A Intro to General Chemistry **or** concurrent enrollment **or** instructor permission)*

____ ENVS 122 Environmental Impact Analysis: CEQA and NEPA

____ ENVS/GOVT 128 Environment and the Law

____ ENVS/GOVT 171 Environmental Politics and Policy

(Prereq: ____ Instructor permission)

____ ENVS 187 Environmental Studies Seminar

____ ENVS 190 Senior Thesis

*(Prereq: ____ Instructor permission **and** completion of all lower and upper division ENVS classes)*

____ ENVS 195 Environmental Studies Internship *(Prereq: ____ Instructor permission)*

C. Environmental Studies Electives

*Select **two** of the following:*

____ ENVS 110 Contemporary Environmental Issues *(Instructor permission)*

____ ENVS 130 Environmental Toxicology

(Prereq: ____ CHEM 6A Intro to General Chemistry or instructor permission)

____ ENVS 144 Sustainability in the Tropics

____ ENVS 149 Agroecology

____ ENVS 151 Restoration Ecology

____ ENVS 158 Wetlands Ecology

____ ENVS 163 Ethnoecology *(Instructor permission)*

D. Interdisciplinary Electives

*Select **two** of the following:*

____ ECON 110 Cost Benefit Analysis

(Prereq: ____ ECON 1B Introduction to Microeconomic Analysis)

_____ ECON 123 Resource Economics *(Prereq: ____ ECON 1B Microeconomic Analysis)*

_____ECON 162 Energy Economics *(Prereq: ____ ECON 1B Microeconomic Analysis)*

____ ENVS/HIST 165 American Environmental History

_____ENVS/SOC 138 Environmental Sociology

_____GEOG 147 Urban Geography

____ GEOG 148 Urban and Regional Planning

_____GEOG 149 Transportation Geography

*(Prereq: ____ GEOG 141 Geog of Econ Activity **or** ____ GEOG 147 Urban Geography **or** ____GEOG 148 Urban and Regional Planning)*

_____GEOG 161 California's Water Resources

_____GOVT 180 California State and Local Government

_____RPTA 148 Experiential Education in Outdoor Recreation Settings **or**

_____RPTA 153 Environmental Interpretation and Outdoor Education

E. Other non-required courses (require instructor permission):

____ ENVS 199 Special Problems

Bachelor of Science (B.S.)

Total units required for the major: 65-66

(Courses in parentheses are prerequisites.)

A. Required Lower Division Courses (23-24 units)

____ BIO 1 Biodiversity, Evolution, and Ecology

____ BIO 2 Cells, Molecules, and Genes **or both** ____ BIO 10 Basic Biol Concepts **and** ____ BIO 15L

____ CHEM 1A General Chemistry I **or** CHEM 6A Intro to General Chemistry

____ ECON 1B Introduction to Microeconomic Analysis

____ ENVS 10 Environmental Science

____ GEOG 1 Physical Geography **or** ____ GEOL 10 Physical Geology

B. Required Upper Division Courses (21 units)

____ BIO 160 General Ecology

*(Prereq: ____ BIO 10 Basic Biological Concepts, **or both** ____ BIO 1 and ____BIO 2) **and***

(Prereq: ____ STAT 1 Introduction to Statistics)

____ ENVS 111 Environmental Ethics

____ ENVS 112 International Environmental Problems

(Prereq: ____ WPJ Examination passed with score of 80+)

____ ENVS 120 Quantitative Methods for Environmental Scientists

(Prereq: ____ STAT 1 Introduction to Statistics & Instructor permission)

____ ENVS 121 Field Methods in Environmental Science (*Instructor permission*)

____ ENVS 187 Environmental Studies Seminar

____ ENVS 190 Senior Thesis

*(Prereq: ____ Instructor permission **and** completion of ENVS required courses)*

____ ENVS 195 Environmental Studies Internship

(Prereq: ____ Instructor permission)

C. Policy Electives (3 units)

*Select **one** of the following:*

____ ENVS 122 Environmental Impact Analysis: CEQA and NEPA

____ ENVS/GOVT 128 Environment and the Law

____ ENVS/GOVT 171 Environmental Politics and Policy

D. Environmental Studies Electives (*Select **three** of the following - 9 units):*

____ ENVS 110 Contemporary Environmental Issues *(Instructor permission)*

____ ENVS 130 Environmental Toxicology *(Prereq: ____ CHEM 1A **or** ____ CHEM 6A)*

____ ENVS 144 Sustainability in the Tropics

____ ENVS 147 Urban Agriculture and Aquaponics

____ ENVS 149 Agroecology

____ ENVS 151 Restoration Ecology

____ ENVS 158 Wetlands Ecology

____ ENVS 163 Ethnoecology

E. Interdisciplinary Electives (*Select* ***three*** *of the following - 9 units)):*

____ BIO 103 Plants and Civilization *(Prereq: ____ BIO 10 Basic Biological Concepts)*

____ BIO 112 Plant Taxonomy *(Prereq: ____ BIO 1* ***and*** *____ BIO 2)*

____ BIO 118 Natural Resource Conservation *(Prereq: ____ BIO 1* ***and*** *____ BIO 2)*

____ BIO 157 General Entomology *(Prereq: ____ BIO 1* ***and*** *____ BIO 2)*

____ BIO 162 Ichthyology: The Study of Fish *(Prereq: ____ BIO 1* ***and*** *____ BIO 2)*

____ BIO 164 Herpetology *(Prereq: ____ BIO 1* ***and*** *____ BIO 2)*

____ BIO 166 Ornithology *(Prereq: ____ BIO 1* ***and*** *____ BIO 2)*

____ BIO 168 Mammalogy *(Prereq: ____ BIO 1* ***and*** *____ BIO 2)*

____ BIO 169 Animal Behavior *(Prereq: ____ BIO 1* ***and*** *____ BIO 2)*

____ BIO 173 Principles of Fisheries Biology *(Prereq: ____ STAT 1* ***and*** *____ BIO 160)*

____ BIO 179 Principles of Wildlife Management *(Prereq: ____ BIO 160* ***and*** *____ BIO 166 Ornithology* ***and*** *____ BIO 168 Mammology)*

____ ENVS/SOC 138 Environmental Sociology

____ GEOG 107 Remote Sensing

____ GEOG 109 Geographic Information Systems

____ GEOG 110 Advanced Geographic Information Systems *(Prereq: ____ GEOG 109)*

____ GEOG 111 Elements of Meteorology *(Prereq: ____ GEOG 1* ***or*** *instructor permission)*

____ GEOG 113 Climate *(Prereq: ____ GEOG 1, GEOG 5 Violent Weather/Changing Atmosphere, GEOL 8 Earth Science, GEOL 10,* ***or*** *instructor permission)*

____ GEOG 115 Geography of Plants and Animals *(Prereq: ____ GEOG 1* ***or*** *instructor permission)*

____ GEOG 116 Global Climate Change *(Prereq: ____ GEOG 1* ***or*** *instructor permission)*

____ GEOG 118 Earth Transformed

____ GEOG 161 California's Water Resources

____ GEOL 127 Hydrogeology *(Prereq: ____ CHEM 1A* ***and*** *____ GEOL 10* ***and*** *____ GEOL 10L Lab* ***and*** *____ GEOL 12 Historical Geology* ***and*** *____ MATH 26A* ***or*** *___ MATH 30* ***and*** *PHYS 5A)*

____ GEOL 130 Oceanography

____ GEOL 140 Geology and the Environment
(*Prereq: ____ WPJ Examination passed with score of 80+)*

____ RPTA 153 Environmental Interpretation and Outdoor Education

F. Other non-required courses (require instructor permission):

____ ENVS 199 Special Problems

Appendix 2

Rubric used to evaluate student writing, adapted from Northeastern Illinois University's writing rubric (http://www.csusm.edu/ids/course-design-and-instruction/assessment/rubrics/writing_rubric_Northeastern.pdf).

Quality Criteria	**No/Limited Proficiency** (1 point)	**Some Proficiency** (2 points)	**Proficiency** (3 points)	**High Proficiency** (4 points)
1. Thesis/Focus: (a) Clarity (b) Originality	Reader cannot determine thesis & purpose OR thesis has no relation to the writing task.	Thesis and purpose are somewhat vague OR only loosely related to the writing task, AND/OR unimaginative	Thesis and purpose are fairly clear and match the writing task. Thesis and purpose are somewhat original.	Thesis and purpose are clear; closely match the writing task, and provide fresh insight.
2. Organization	Unclear organization OR organizational plan is inappropriate to thesis. No transitions. Does not adhere to organizational conventions for assigned writing format.	Some signs of logical organization in support of the thesis. Transitions are abrupt, illogical, and ineffective. May deviate substantially from organizational conventions.	Organization supports thesis and purpose. Transitions are generally appropriate. However, sequence of ideas could be improved. May deviate slightly from organizational conventions.	Fully & imaginatively supports thesis & purpose. Sequence of ideas is effective. Transitions are smooth and effective. Follows organizational conventions for type of writing.
3. Support/ Reasoning: (a) Ideas (b) Details	Offers simplistic, undeveloped, or cryptic support for ideas; Inappropriate or off-topic generalizations, faulty assumptions, errors of fact.	Offers some support that may that may be dubious, too broad or obvious. Details are too general, not interpreted, irrelevant to thesis, or inappropriately repetitive.	Offers solid but less original reasoning. Assumptions or reasoning connective evidence to conclusion are not always made explicit. Contains some appropriate details or examples.	Substantial, logical, & concrete development of ideas. Assumptions are made explicit. Details are germane, original, and convincingly interpreted.
4. Style (a) Sentences (b) Diction (c) Tone/Voice	Superficial and stereotypical language. Oral rather than written language patterns predominate.	Sentences show little variety, simplistic. Diction is somewhat immature; relies on clichés. Tone may have some inconsistencies in tense and person.	Sentences show some variety & complexity. Uneven control. Diction is accurate, generally appropriate, less advanced. Tone is appropriate.	Sentences are varied, complex, & employed for effect. Diction is precise, appropriate, using advanced vocabulary. Tone is mature, consistent, suitable for topic and audience.
5. Writing Conventions: Grammar/Spelling/ Usage/Punctuation	Mechanical & usage errors so severe that writer's ideas are difficult to understand.	Repeated weaknesses in mechanics and usage. Pattern of flaws.	Grammar and syntax are correct with very few errors in spelling or punctuation.	Essentially error free. Evidence of superior control of diction.

Appendix 3

Knowledge/Skills/Experience required for California State civil service exams

Key: R = Required; A = Available through program coursework or research opportunities; O = Available through other coursework (e.g., outside of the ENVS program) or other experience; N = Not addressed

California Civil Service Consortium Exam - Environmental Scientist (General Requirements)

Knowledge

Quality assurance and/or quality control procedures for scientific projects (R)

Data collection techniques to ensure the accurate collection of data for research and monitoring activities (R)

Basic principles of land, water, fish, forestry, wildlife, and other natural resources (R)

Basic laboratory procedures to ensure the appropriate collection, analysis, and interpretation of environmental samples (R)

Basic scientific research principles and methods to ensure the integrity and validity of collected data (R)

Principles of biology, chemistry, and/or physics pertaining to environmental science and environmental health (R)

Basic biological, physical, and/or chemical testing standards and/or methods (R)

Experience

Assisting in conducting scientific studies related to issues of public health, natural resources, or the environment (A)

Participating in and/or assisting with inspections, evaluations, investigations, or interviews to ensure compliance with statewide laws, regulations, and/or project objectives (N)

Preparing and/or reviewing environmental and/or scientific documents to meet project objectives and/or make recommendations (A)

Preparing and writing documents to communicate scientific and technical information (R)

Collecting data and/or samples through use of standardized techniques and tools in accordance with project objectives and protocols (R)

Conducting and/or assisting in the analyses and interpretation of scientific data and/or methodology to identify key issues and draw conclusions (R)

Interpreting quantitative data and/or statistical results to extract information and make inferences (R)

Use the internet to conduct on-line research and obtain information related to departmental policies, procedures, and resources to complete program or project activities (R)

Follow written and oral instructions, directions, guidelines, and procedures in the completion of assignments (R)

State Water Resources Control Board Training and Experience Exam - Environmental Scientist

Knowledge and Skills

Geographic Information Systems (GIS) software (A)
Power Point software (A)
Statistical software (A)
Spreadsheet software (R)
Database software (A)
Word Processing software (R)
Participating in public meetings to inform interested persons and groups about environmental issues (O)
Analyze and interpret scientific literature (R)
Assessing the quality of environmental data (R)
Application of the principles of environmental ecology (R)
Application of statistical methods of analysis (R)
Principles of land use practices with reference to their general effect on human health and the environment (N)
Principles of land and water resources research (R)
Botanical field studies (A)
Wildlife field investigations (O)
Fisheries streams survey (habitat evaluation) (R).
Design of an ecological risk assessment (A)
Perform and ecological risk assessment (N)
Perform wetland delineations according to federal guidelines (A)
Develop a wetland monitoring program (A)

Develop any aspect of wetland mitigation, restoration, or enhancement plans (A)
Develop a surface water sampling plan (R)
Collect surface water samples (R)
Ability to identify the types of pollution that commonly enter storm drains (A)
Ability to identify storm water discharges and impacts on human health and the environment (A)
Ability to identify the components that contribute to sources of pollutants in surface runoff (A)
Ability to identify components that contribute to sources of pollutants in agricultural runoff (A)
Ability to identify impacts of chemicals in surface water (lakes, estuaries, bays, streams, etc.) on aquatic life (A)
Ability to identify impacts of nutrients in surface water (lakes, estuaries, bay, streams, etc.) on aquatic life (R)
Develop a study design for identifying sources of pollutants within a watershed (R)
Develop recommendations/planning tools for watershed pollutant reduction (N)
Groundwater monitoring and assessment (O)